

BULLETIN OF THE

TAYLOR SOCIETY

A SOCIETY TO PROMOTE THE SCIENCE AND THE
ART OF ADMINISTRATION AND OF MANAGEMENT

THE PROBLEM OF THE CHIEF EXECUTIVE

A consideration, from the point of view of the medium-sized enterprise, of what the chief executive should be and do; incidentally some observations on the proved value of scientific management on a falling market.

A TECHNIQUE FOR THE CHIEF EXECUTIVE

"The job of the chief executive is as concrete as the job of the production manager, the sales manager, and a number of other executives whose functions are hardly less complex though on a different scale." An explanation of a proved method of executive control.

MEASURING WASTE IN INDUSTRY

An examination of the method of investigation (not of the findings) of the (Hoover's) Committee on Elimination of Waste in Industry. Did the Committee's method constitute a beginning out of which will be perfected a valuable instrument for investigation?

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COMMENT

THIS issue of the BULLETIN will stand as another mile-post in the development of the Taylor Society for it marks the extension of the Society's interest to the problems of the chief executive, problems of general supervision and control. The extent of the Society's field of inquiry is now fairly complete; ten years ago limited almost exclusively to the management of the shop (Mr. Taylor's study of which had given us the fundamental principles of good management), it has come to include personnel management, office management, the management of distribution, and now the general management of the chief executive, including finance and accounts.

IT is an unusually happy coincidence which permits us to present the combination of articles which appears in the following pages. Each is of especial interest to the chief executive—and because the chief executive is primarily a coordinator of departments, to every departmental executive. Mr. Kendall's address takes up the responsibilities of the chief executive; considers what he must be and what he must do. It presents the point of view of the medium-sized enterprise, the chief executive of which must not only be concerned with general policies and plans, but must also be able to take his place at the wheel and navigate the ship. But a statement of what a chief executive should be and do is not sufficient; it is essential to know something about how to do it. This need is met by Mr. Williams' complementary paper, wherein is presented a concrete method for the chief executive which has been utilized and proved.

THE discussion in this issue of the report of the Committee on Elimination of Waste in Industry should help to clarify thinking concerning the purpose of the report and the methods employed. Believing that the methods employed, independent of the findings, might prove to be of value for future similar investigations, the Taylor Society devoted a session of its December meeting to an examination of the technique of the investigation. That examination seemed to bring out the following essential facts: the circumstances which inspired the investigation compelled an early report and therefore rapid work—six months was set as the limit; it was decided that the investigation would have to be of the nature of an assay rather than of a comprehensive and intensive survey; it was recognized that the methods of objective science (elaborate experiment and comparison) could not be employed within the time limit set—probably even if there were no time limit; it was recognized also that an investigating personnel would have to be selected which could bring to the investigation standards of appraisal derived from previous intensive professional experience in investigation of waste in detail, and that the method of investigation would have to be a matching of performance standards discovered by observation against master standards already proved by experience. Consideration of the value of the methods of the Committee therefore centers around the questions whether there are worthwhile proved master standards and whether a matching of such standards against performance standards is a dependable method of assaying conditions of waste.

NOW IS THE TIME!

RIDING in the smoking room of a Pullman the other day, we could not avoid overhearing several gentlemen discuss scientific management. The following is the point upon which they seemed to agree: "Scientific management is a fine thing when you need it; but it takes time to get it, and by the time you have got it the need for it is past."

We recommend to like-minded executives a careful reading of Mr. Kendall's address on another page. In it will be found the testimony of a chief executive of vision and leadership who has proved scientific management.

Of course the development of scientific management takes time; that is what gives it its power and permanence and distinguishes it from the "installation" of ready-made "systems" which do not fit, do not produce, and do not last. The development of scientific management in a plant is essentially an educational process; it required research and experiment to determine facts, the setting up of standards and methods of procedure in accordance with the facts, and the development of an understanding of mutual responsibilities and a cooperative spirit. Because it is an educational process it requires time, but like all educational results, it is something permanent the values of which can never be lost.

And Mr. Kendall gives testimony that there is no truth in the statement that "by the time you have got it, the need for it is past." If it yields results on a market of rising prices and active business, it is also a great aid in the readjustment to new conditions on a market of falling prices and decline in business. It gives control and power on the up grade, and control and steadiness on the down grade.

The muscular strength and skill, the coordination of eye and hand and foot, the sense of location and reliability of foot-holds, which are essential to the mountain climber when he ascends a precipice, are no less essential when he makes the descent. Likewise, with respect to scientific management; the command of facts and the resultant precision of action which are profit-making in times of prosperity, are life-savers in times of depression.

It is now time for executives to set their houses in order. There are several reasons for *now*. The development of scientific management does take time, and the earlier it is undertaken, the better. It is as effective in meeting the problems of a depression as in

realizing the advantages of industrial activity; it may in such times as the present turn a deficit into at least a breaking even. It is easier to develop if begun while the organization is in skeleton than after new people are added to the staff. Last, but not least—strenuous times are immediately ahead.

What are to be the characteristics of the next cycle of industrial development? Mr. Kendall prophesies an intenser competition than we have ever known, in which the race will be to the strongest, and in which the strongest will be those who have the most finesse in management—the best knowledge of markets, the best knowledge of their products, the greatest skill in producing sales, the most precision in production, the lowest costs. Scientific management points the way to all of these, and no other form of management does.

One should not be pessimistic, but one should be impressed by the facts. There have been in our history three high peaks of prosperity, as marked by high prices and business activity. The first coincided with the War of 1812, the second with the Civil War, the third with the World War. After the War of 1812 there was a period of decline in prices which lasted about thirty years, but because of the opening up of new regions and resources by the development of transportation, of increase of population and markets by immigration, of an undisturbed foreign demand, and of great advance in labor-saving mechanical inventions, recovery came and a prosperous period of twenty years followed, notwithstanding permanently increased wages. After the Civil War there was a similar period of depression, a similar recovery for almost identical reasons, followed by a period of rising prices and activity which lasted through the World War. But after the World War—what? There is ahead no new territory to be opened up with vast resources to be exploited, no great increase of population, apparently no opportunity for marked progress in labor-saving mechanical invention, the foreign market will remain for a long time disorganized, and productive capacity is for the time being relatively over-developed.

Refinement of management is Mr. Kendall's answer. That is the way out for executives of vision and grit. It is time for American executives to pull themselves out of what a Bunyan would call The Slough of Lost Morale—the principal trouble with American industry just now. With respect to the leaders, Mr. Kendall's address tells what they must be and do, and Mr. Williams' address following describes a proved way of doing it.

THE PROBLEM OF THE CHIEF EXECUTIVE¹

FROM THE POINT OF VIEW OF THE MEDIUM-SIZED ENTERPRISE

BY HENRY P. KENDALL²

I DESIRE first to express my appreciation of the pleasure you have given me in inviting me to speak on this particular subject. I want to congratulate the Society on the extension of its field of interest. Ten years ago we were concerned almost exclusively with the problems of production; a few years ago attention was turned in addition to the problem of selling; very recently the problems of general administration—of the treasurer, the comptroller, the chief executive—have come to claim their share of interest.

Our field of inquiry now is logically rounded out. I am glad to be permitted to contribute my bit in exploration of the field of responsibility represented by the chief executive.

The Point of View of the Medium-Sized Enterprise

My background is that of the small or medium-sized enterprise. We read a great deal about and hear a great deal about the large organization—the United States Steel Corporation, the International Mercantile Marine, and other big enterprises. The many schools of business administration which are doing such admirable work in business organization and finance focus their attention chiefly on the large institutions. I propose, however, to speak from the point of view of the small enterprise—one which is small enough to demand from its chief executive an intimate knowledge of the business, yet large enough to have the organization departmentalized and the chief executive free, as he should be, from routine executive work; an enterprise in which (to use a figure of speech suggested by the squally times through which we have been passing)

the chief executive as sailing master in fair weather can leave detail management to his mates, but in which also in squally weather he can step to the wheel, keep his eye on the sky and wind and sails and compass, and show himself master in the handling of his craft. The master of such a craft must be on the one hand big enough to know the seas and shores, the rocks and rips, the skies and winds, and he must on the other hand be familiar with the detail handling of a ship.

In a business of this type the chief executive must be responsible not only for long-run and short-run policies and plans, but also for the organization of the enterprise and the coordination of departments—for keeping the heads of the various departments working together as a team.

Major Departments

I recall that some years ago, probably at one of our meetings, I expressed the opinion that an organization is logically divided into four departments—sales, production, finance and accounts, and personnel—and that they should be coordinate departments. I think I shall have to modify that now, and say that the departments which seem to be always major are three—sales, production, and finance and accounts; while other departments may be either major or secondary, or at one time major and another time secondary, according to the nature of the business or to particular circumstances. Purchasing, for instance, in some industries or at certain times may be routine in nature and subsidiary to production; in other industries or at particular times it may be relatively so important as to be a major department. One of the businesses in which I am interested is typical of many others; the purchase of one of the materials—cotton and cotton cloth—is so closely related to merchandising and to selling that, during these times of uncertain markets, we have taken such purchasing out of general mill-supply pur-

¹ An address delivered before the Taylor Society, Philadelphia, March 16, 1922.

² Boston, Mass. President Lewis Manufacturing Co., Wateree Mills, Addison Mills, Walpole Trust Co., Slatersville Finishing Co.; Treasurer Plimpton Press; member of firm Holliston Mills; Director First National Bank (Boston), Reed-Prentice Co. (From *Who's Who*, 1920-21.)

chasing, which reports to the production manager, and made it, if not a major department, one which is nearly so in that it reports to the chief executive. In many manufacturing businesses the purchasing is more important than other phases of the business. In cotton manufacturing the value of the cotton is on the average two times the value of the wages and salaries and at the same time it is closely related to the merchandising of the product.

Then there is engineering. In many plants engineering means simply maintenance of plant, power transmission and mechanical equipment. In others, as in General Electric, Westinghouse or public utilities, engineering is almost the most important function of the management, and is coordinate with other major departments.

Advertising is properly regarded as a tool of selling. I imagine that to advertising can be applied the definition of a mine, a hole in the ground into which money is poured, but in some businesses, such as are represented by one of the great clothing manufacturers of Chicago, advertising may dominate what is ordinarily called merchandising, and become a major department and the advertising manager essentially the merchandising manager; quite properly, in the particular instance, a reversal of the usual procedure.

With respect to finance and accounts; if there is a comptroller, the treasurer may in many instances be but a glorified cashier or trustee of funds; but if there is intricate financing to do, there is logically coordinate responsibility of both treasurer and comptroller.

In many enterprises the function of industrial relations may be of such importance as to be classified as a major department, the head of which reports directly to the chief executive; in others it may properly be subsidiary to some other major department.

Research may be a major or a secondary function in an enterprise. There may be sales research headed up under the sales department; or research in industrial processes headed up under the production department; but in some enterprises—as in the electrical industries—research may be relatively so important as to be properly a major department.

Likewise with respect to legal and other staff functions; usually minor in importance, in some industries one of these may loom up as of major importance.

I have named some eight divisions of a moderate-sized enterprise which may be major departments, too many to be reporting to one chief executive. At a dinner the other evening I heard the president of the

Western Electric Company asked how many people should report directly to the president of a large industrial company. He said eight or nine were reporting to him at the present time, but that it was too many and he was reorganizing his executive function so that only four or five would report directly to himself; and I imagine that four or five is enough. Not that a chief executive should not have contact with others; but that is about as many general functions as should directly and regularly head up to him.

Organizing the Enterprise

The first big responsibility of the chief executive is the organization of the enterprise. I used to think that organizing ability and executive ability were practically synonymous terms. I have changed my opinion on that; and one of the most convincing experiences which would have caused me to change my opinion, had I not done so earlier, was in Washington during the war. Many a big man, with the reputation of being in his business a super-man, came to Washington and failed signally as an organizer! In his own business he had been all his reputation claimed as an executive working out policies and making routine decisions day after day; and it was concluded, therefore, that he would be a great organizer; but when it came to creating new organizations in Washington—that was quite another matter! Why? Because the difference between organizing or creative capacity and executive ability was usually not recognized when men were called to service in Washington.

I was much interested in hearing Walter Dill Scott give some testimony to the point. You will recall that he created an organization in the War Department to classify and rate the draft army. A part of his organization was in Washington and the larger part at the cantonments supervising work. He said that, curiously, no constructive ideas came from the men at the cantonments; creative ideas came from the men in Washington. He concluded that the men at the cantonments were so busy at the executive function—keeping the work in hand going smoothly—that their minds did not have time to function on the creative side. So he tried the plan of alternating men between the cantonments and Washington, and he found surely enough that men who had not given birth to a constructive idea while at the cantonments, became creative at Washington where their jobs were to think and they could see things in perspective.

This function of organization, of selecting and de-

veloping a staff, is one of the most important for which the chief executive is responsible, and presents many interesting aspects. I can take the time to consider only two or three of these.

It takes time to develop an organization. Nothing illustrates better the idea that the boy is father to the man. The good organization of today was not built today or yesterday or last year; it is the outcome of policies and plans established a good many years ago. You cannot develop an organization inside of five years—probably not inside of ten. The only exceptions I have seen were two or three instances in Washington during the war, when under the particular conditions the few organizers who knew what they wanted could reach out over the country and pluck any man of tested and known capacity. But in the course of developing organizations in industry it cannot be done in that way.

Another phase of the organization problem is this: as a business grows the kinds of responsibilities required by the different departments change, but not all men have the capacity to develop to meet the demands of these changes. When an organization is small an executive may be found who is splendid as a department head, but as the responsibilities of the department increase in range and intensity he does not develop a corresponding capacity. It has been said that all men are born free and equal, but that seems not to be so. You can find differences as great as 400 per cent in the capacities of workmen at machines or benches, but can find greater differences than that in the capacities up the line of executives. If the business is growing and the responsibilities of the various members of the organization are increasing, the chief executive will soon find himself confronted by personal problems; he is faced by the problem of relieving men of responsibilities which have increased more rapidly than have their capacities or of permitting the supervision of a function to become unbalanced in its relation to the supervision of other functions—a deterioration of coordination. It is a delicate and difficult task, this shifting men around or possibly pensioning them off and at the same time retaining cooperation and good will. It is a problem the chief executive must face alone.

Now just because this problem of organization illustrates the idea that the boy is father to the man, it is essential for the chief executive to keep his eye on the junior executives. I have made it a principle—not without exceptions—not to permit an executive to select his assistants. That is against the theory and practice of a great many chief executives. I hold to

my particular point of view, not because executives are not reasonably successful in selecting assistants, but because an executive is not likely to select an assistant who is complementary to and rounds out his own personality and capacity. Few men have all-round capacity; there is some part of every executive not so well developed as some other part. If he alone selects his own assistants, he is likely to select a man who is cast in the same mold as himself, who is not likely to round out the capacity of his chief, who is not likely to stimulate him. On the other hand there must not be too great a difference in characteristics. There was an article in the *Atlantic Monthly* recently which suggested that one reason for friction in a family is a difference in tempo between husband and wife—one perhaps has quick and the other slow mental reactions, so that there is always an absence of adjustment each to the other. A similar situation may occur in a department of an organization. If there is too wide a gap in intellectual capacity, capacity for initiative, there is likely to be friction which inhibits the best capacity of each. Like two horses they may be differently gaited and unable to pull together smoothly and effectively. I sometimes use Roosevelt and Taft as an illustration. Each was splendid in the field calling for his particular individuality and capacity, but one could not with confidence see them hitched together and sharing the same executive responsibility. If the chief executive and his assistants are wise in the selection of junior executives they will supplement a major executive with an assistant of a complementary type—enough different to stimulate him, but not so different as to impair *esprit de corps*. William James in an address on the value of a college education made the statement that its value sums up in the ability to know a good man when one sees one. The selection of major and junior executives is one of the great responsibilities of the chief executive.

Handling the Organization

A good many years ago I read in some magazine an article entitled "Hands." Among other things it described the hands of the skillful driver of horses; calling attention to the fact that some men have a delicacy of touch which is marvelous, enabling them to anticipate what a horse is going to do and to convey information to the horse; an uncanny skill controlling and guiding the nervous, restless and excitable horse. It is not muscular strength, but a delicacy of touch, an intangible something. Now I believe there is a similar

finesse in handling an organization, not by giving orders and commands—I think that is seldom necessary—but by delicacy of touch on the reins—suggestion and inspiration; something of that sort, if you please. You can find plenty of instances in which the chief executive has delicacy of touch or not.

The Value of Perspective

There are many things which enter into the capacity of a chief executive to direct an enterprise and guide the associated executives. Not the least of these is the ability to take a detached point of view. The chief executive must not make the mistake of always standing at the wheel. In the medium-sized plant which we have in mind he should be able to do that in time of emergency, but at other times he should be free from details. He should be able to study his business from the mountain peak, in perspective; he should be a student, not merely of his own business, his own product or his own market, but from the point of view of the industry to which his business belongs, general market conditions, general financial conditions, the economic conditions of the country, the conditions and tendencies of business the world over. Of course, it is necessary to meet the payrolls today and tomorrow, but the chief executive who is thinking in terms of years ahead is he who can make the quick and sound decisions today. The chief executive should have imagination and build a picture of the future; the development of his business, the plant, the organization, its personnel. He should construct a drama of the future in his mind, peopling it with personalities and achievements; a drama always changing in the light of new information and new ideals. But although the drama may be a changing one, at any moment it stands as a definite plan in accordance with which the decisions of the moment may be made; and the more wisely because there is such a plan in the background of the chief executive's mind. It is sometimes surprising to a staff how a chief executive can give a quick and accurate decision, even before a proposition is completely stated; but it is because he has dreamed his dream, has his plan for the future, and can instantly relate the particular problem to it.

But the chief executive cannot do that if he is overwhelmed with correspondence and other routine work. It is essential that he shall have opportunity for detachment; shall keep a generous margin of safety for studying his business in perspective, for long-run policies and plans; a generous margin of safety against fatigue

and exhaustion of energy—the fatigued mind is the timid mind. There are times when the executives must be called together to consider problems which seem almost insurmountable. If the chief executive cannot carry into such a conference vision and a vast range of information got from outside contacts, reading, thinking and observation, a fresh and agile mind, an optimism, enthusiasm and inspiration which he can pass along to others and inspire them to pass along throughout their departments, then he is deficient in his responsibility. I hold to the theory that executive capacity is something more than an intellectual quality. I believe that the years in which I have done my least effective work are the years in which I have permitted myself to become too much occupied with routine, and the years which have counted most have been the years when I have spent part of my time upon the mountain height studying my business and business in general in perspective. And it is a duty of the chief executive to inspire each of his associates to maintain the same margin for study of his responsibility in the large, and the same margin for health and a clear mind.

Imagine the responsibility of the sales executive in these times. When the men come in from the field, discouraged, dejected, having lost confidence in their house, their product, and believing that competitors are having everything their own way, then it is the responsibility of the sales management to bring to the problem that optimism, that buoyancy, that bright eye and pleasant smile and those keen and encouraging words which will bring to his men an inspiration which will send them back into the field with enthusiasm and with the certainty that they are riding on the top of the world.

That is possible only if the chief executive and all executives—major and junior—preserve a generous margin for the healthy mind in a healthy body.

Coordination of Functions

We are considering the responsibilities of the chief executive from the point of view of the moderate-sized manufacturing enterprise, and in such an enterprise he himself must be responsible for the coordination of functions. Therefore, he must know the departments and how they operate; he must know their problems and methods, and guide them in working together precisely and without friction to the accomplishment of a common purpose. In time of storm he must be prepared to take the wheel. And he must know what he is doing when he takes the wheel.

Production

We have had a production problem, all of us. During the past decade, and particularly during the war, stress was laid on the production problem—the increase of output per unit of floor space, per machine, per capita. Tremendous work has been done in increasing output and in lowering costs, and the members of this Society have been perhaps foremost in these accomplishments. I have heard many men, some of whom are pretty close students of scientific management, say during the long period of rising prices and active business: "Yes, scientific management is fine on production; you build up a big planning and supervising organization and get results; but wait until the time of falling prices and decreased demand!" And I confess that during the small dips which appeared during the period of general rising prices, I was a bit uncertain, and my confidence in scientific management was not unshaken. But I can bear witness tonight, from actual experience, that without scientific management we would not have been able so securely to meet the decline in prices and in business which we have had to meet during the past year; that without the greater knowledge and greater control which scientific management has given, we would not have been able, in the concerns in which I am interested, to get production down to match demand, to reduce business to fifty-five and sixty-five per cent of normal, and still make both ends meet. It has interested me to observe the greater precision with which scientific management has enabled us to meet the situation; for instance, to see the ratio of sales to inventory change from 2 to 1 a few years ago to 4.5 to 1 after the Armistice, and then when greater pressure came on, to 7.5 to 1, a thing which we would have thought impossible a few years ago. I am glad to have been able, on purely selfish grounds, to demonstrate what scientific management can do with falling prices, a falling market and a falling production.

Our manufacturing problem today is not the problem of guiding increased production, but the problem of guiding decreased production. Students of our capacity tell us that we have a thirty or thirty-five per cent over-equipment in this country. They have said that in the past a seventeen per cent reduction in demand has been sufficient to cause an industrial panic. Our production problem is to adjust ourselves to the demand—only temporarily lowered, let us hope—without an industrial panic. The more precise the production control, the easier are such adjustments.

Sales

There are a few real merchants in industry today. Practically every enterprise has its sales manager, but so far as I can see, skill in merchandising, a science of merchandising, is very little known in industry. There has been a lot of literature on selling, but we still have much to learn. There are industries which have not learned merchandising at all. I heard one of the closest students of marketing say, a short time ago, that two industries had never learned how to merchandise their products—the textile and the paper industries. I happen to be interested in both, and I think he is right. So far as it has been my fortune to observe, the textile industry in this country does not know how to merchandise. In that industry success or failure today may rest upon the ability to merchandise.

The emphasis is now upon selling. How can we build up business? There are three essentials to selling: knowing your product, knowing the market and knowing the trade channels. The problem of the sales executive backed by the chief executive today is, on the basis of these three essentials, to create new markets. To guide and sustain the sales executive, the chief executive should know as much about merchandising as the latter, and should now focus his attention upon the latter's problem. He has got to help the sales executive master the situation in one of three ways: find a new market for the product, modify the product to meet the requirements of an existing market, or develop a new product to meet the requirements of an existing market. For instance, take the great manufacturers of yeast. Home baking has declined, and the yeast business was faced with disaster. But yeast has been developed as a food in itself, and, if one can trust the advertisements, it furnishes that one thing necessary to our existence of which we have never had enough before! As the result of an enormous production and supply of Gillette razors, the manufacturers were faced with the problem of what to do to keep the plant busy. They modified their product and created a new market; every possessor of a Gillette razor came to believe that he must have the latest improvements, and the sales of that company increased more than ever before in their experience. Consider the cereal business; most of the large manufacturers were in distress because of the deflation in value of wheat and other cereals. A little concern in my town attacked the problem and as a result has had a remarkable experience. They developed a fruit-nut-cereal, and every-

body around there is now eating fruit, nuts and cereal in the same dish every morning. They met the situation by studying the market and modifying their product. What did the grape growers do when faced with disaster? They found a new market, and it is astonishing how the only way you can get iron into your backbone is by eating Sun Maid raisins! A bit of a hole in the wall with a counter no longer than this table, in one of the business streets of Boston, is said to be selling three or four cases a day; and one cannot go anywhere, from a newspaper stand to a cigar store or a drug store, without observing people paying good money to get iron into their systems!

Never have the sales manager and the chief executive been faced with the problem of selling their products, as they are today. It has become a problem of real merchandising; knowing your products and your competitor's products; knowing the market and the trade channels. The salesmen of one of the concerns in which I am interested have been reporting for fifteen years that in one item we were doing sixty-five to seventy-five per cent of the business of the country. And we all believed it! But as a result of some recent critical sales research we have discovered that for the year 1921, when we had the largest output in our history, we were doing only thirty-eight per cent of the business of the country. While that was disappointing to some of the organization, it was particularly heartening to me; I saw a sixty-two per cent mark to shoot at instead of a thirty-five per cent mark.

You cannot secure a control of sales until you have real merchandising; until you know what each department can do and at what cost, and what each market and each section of a market can take, all with respect to each product. Then you can develop quotas; then you can make budgets of sales and production; then you can develop budgetary and financial control.

Finance and Accounts

The chief executive must be free from detail, but he must know constantly the details of progress and accomplishment. Information must come to him, so organized, pre-digested and interpreted as to give him a picture of conditions. That makes finance and accounts one of the most important functions of an enterprise.

Mr. Charles G. DuBois, president of the Western Electric Company, who came to his position through the accounting-comptroller line and who practically established in American industry the importance and

technique of that function, was once asked why, with so many interesting functions and opportunities in Western Electric, he chose accounting. He replied, "Because there was no competition in that line." Finance and accounting, and the work of the comptroller, represent a side of management which in the past has received too little consideration and has been valued at too low a figure.

What is needed for the shaping of policies and an intelligent control in an enterprise? First, a balance sheet and income-expense report. Some executives are satisfied with such a report once a year; some require it every half year or every quarter. I do not feel comfortable if I do not have one every four weeks, and the accountant has to get his statement in promptly at the close of each four-week period. This gives a cross-section of the business thirteen times a year; but that is not enough! Some executives seem to think that a balance sheet and income-expense statement is sufficient. But there are other not less important statements which should come regularly to the chief executive. He should have regularly a balance sheet and profit and loss statement (so to speak) on every product and every market—such as unit costs and sales for each product and sales by territories and products. He should have weekly a summary of cash tendencies. The sales manager, the production manager, each executive should have similar reports covering his respective interests. There can be no strategy of merchandising and production for the chief executive, and no tactics for the departmental executives, without the information and control yielded by such reports.

The banks have always centered their attention on the conventional balance sheet and income-expense account, and some of them are coming to give more attention to other information—ratios of balance sheet items and other data indicating tendencies, for various industries. The value of this has been emphasized in recent articles published by Alexander Wall. It has interested me to note that the credit vice-presidents of some of the big banks have begun to realize that they have been giving and refusing credit without adequate information, without knowledge of what they were really doing; sometimes withholding credit and causing bankruptcies at a time when they should have had the confidence and courage to see the concerns through their difficulties. Every business, including the small business, should have the comptroller function developed, even if there is no executive with the title of

comptroller. Some months ago I suggested to the Managing Director that this Society, as a phase of truly scientific management, give attention to finance and accounts, especially financial and statistical control, and I am glad that at the December meeting and again at this meeting there have been papers on that subject.

It has been said that the sales manager should be an optimist. Possibly the comptroller would be classified as a pessimist. At any rate, the other executives are inclined to consider a good comptroller a kill-joy, the gloom-artist of executive committee meetings. The others may point to a big volume of sales, to low production costs, and begin to talk of new plants and equipment and other enormous expenditures, as during 1920; and then the comptroller speaks up: "No, gentlemen; here's your tendency and here's where you're going to arrive next year; instead of expansion its going to be retrenchment"; and he proceeds to kill that vote for a new plant or the investment in a new sales territory. It is a great comfort to a chief executive to know that there is a man on the comptroller's job, surrounded by figures which pour in on him from all sides, digesting and interpreting them, ascertaining tendencies, and finding the substantial facts which give each major executive control in his department and the chief executive control with respect to general policies and plans. I have recommended strongly to the college of which I am a graduate, a college conspicuously launched on the course of cultural education, that they establish two new courses as cultural courses—accounting and statistics; these are the language of the social sciences, of economics, of business.

The Personnel Department

In one section of the country a great strike is in progress, and because there is no need for it, because practically everything management has done in connection with it has been done wrong, I am inspired to emphasize the matter of industrial relations, for which the personnel department has a large responsibility. There have been certain things which the industrial leaders of that region have not wanted, perhaps for reasons of competition; they have not wanted unions; they have not wanted legislative action with respect to hours and working conditions; they have seemed to want to handle labor as a commodity as they handle their raw material as a commodity. They recently posted a notice arbitrarily declaring a general reduction in wages; giving no reasons and in some instances

not even giving the amount. What is the result? There is a great strike; mills and workers are idle; goods have been damaged; deaths have occurred; a lot of ill-will has been generated. And what about the things which the industrial leaders did not want in their industry? One branch of the legislature has passed a forty-eight hour bill; the unions, which were practically bankrupt, have money pouring into their treasuries; two unions which were fighting each other have come together, and new members are enrolling as never before. Public opinion is with the strikers. Practically everything the industrial leaders didn't want has come to pass, largely because of wrong methods.

Perhaps twenty per cent reduction in wages is justifiable at the present time; I am not discussing that point and I am willing to assume that it is justifiable. But the mental attitude; the approach to the problem; the specific measures—everything has been wrong! One might have got away with such attitudes and methods before the war, but it cannot be done now and carry public opinion with it.

One of the best investments any business can make is a competent personnel director or supervisor, in a position of major responsibility, who represents the management to the employees and the employees to the management. He should report directly to the chief executive. The responsibility for the kind of plant you have, the kind of spirit, the output and the efficiency, in a moderate-sized business at any rate, comes right back to the chief executive. The personnel department is the department through which he expresses himself with respect to that phase of his responsibility.

The Future

There is a rather interesting article in a recent number of the *Analyst* in which an economist in one of our great universities suggests what the future of American industry is likely to be. He believes that the boom days are over; that the way to meet the future is by standardization of types of products, by centralizing and standardizing management, and so on. Some of his program resembles that of the late Kaiser or the present Hugo Stinnes. Some of his ideas I can agree with. I believe industry passes through cycles of change. We have had the cycle of the development of labor-saving machinery; the cycle of the growth of the corporate form of industry and of big combinations; the cycle of the distribution of securities and of

the borrowing of capital from wealthy countries of the world; we have seen centralized and cooperative selling and purchasing. What next? From my observation I will hazard the guess that we are about to see a cycle of refinements in management. The profits are going to come from the little savings of standardization, of better-planned and better-controlled operations, with perhaps another wave of centralization. The tendency will be accelerated by the many failures and losses of working capital due to the war and its aftermath; by the fact that production is somewhere between fifty and seventy-five per cent of normal; that labor costs are sixty-five per cent above pre-war normal; that costs are fifty to seventy-five per cent above normal, with lower relative costs in Europe; that the world's financial systems are out of equilibrium. How is industry in the United States going to adjust itself to new conditions; to meet the new competition? Certainly not by an increase of plants, at least in the immediate future. Speaking by and large of industry in general, I think I see a rather drastic reduction in the number of plants—the sort of thing facing the automobile industry, the rubber industry, the metal-working industry, possibly the textile industry. As never before, the race is to the strong; and the strong today is the man who knows his business, who knows how to organize and manage, who leads an organization of enterprising, intelligent, loyal and efficient people—who knows his product and his market, who watches economic tendencies and has command of fundamental facts, who has a control which makes

possible the finest kind of industrial strategy and tactics, who is in every way ready for the most competitive two or three years we have ever seen.

Vision and Leadership

Outside of the immediate strategy of the conduct of his business, what responsibility has the chief executive? It is that of vision of the future and leadership to new relations and conditions. For instance, we have heard, during and since the war, that labor unions are coming to dominate and gain control of industry, that a man can no longer run his own business. There has never been a time when the balance of power has not been with industrial management, and if that situation is upset it will be the manager's own fault. But management must have vision and show leadership. Unfortunately neither our form of government nor our form of industry seem to have been able to develop great leaders. That responsibility is distinctly up to industry; it has a responsibility for the kind of citizenship we are building. There are industrial communities in my part of the country which one dislikes to go into; they are sorry, sad, sickening places; and they have been made so by the probably involuntary and unconscious attitude of a relatively small group of leaders in industry. I believe these communities could develop a happy and prosperous citizenship—and future leadership in industry—were there vision in present leadership. Industrial management must realize its responsibility for these things as well as for excellence in technical management.

FIRST of all, we must appreciate the seriousness of the situation. We have increased our production capacities in many lines as much as forty and fifty per cent, in some lines over one hundred per cent. The exact figures for all fields are not available but there seems to be a general consensus of opinion that thirty per cent increase is a fair estimate. With this increase we have decreased the purchasing power of the world by the loss of earnings or purchasing power of twenty million men killed or maimed in the war. We must fully appreciate the fact that our general business depends to some extent upon our export business in great raw materials. We also have exported fifteen per cent of our manufactured goods. This business is gone for

the present and will be a long time absent.

It is, of course, obvious that we had no general increase in business, population or wealth in this country to offset this real loss. Therefore, we are faced with the problem of either closing down a part of our plants or seeking and finding new markets for our products. In this situation one important fact seems to have been established in the minds of the bankers. What we can sell is more important than what we can manufacture. This fact will, in the future, cause a greater insistence on the part of financial backers of business that sales plans shall be as accurately planned and developed as production plans. ("Sales Planning, 1922" p. 4, by Harry R. Wellman).

A TECHNIQUE FOR THE CHIEF EXECUTIVE¹

A DEFINITE RESPONSIBILITY—A DEFINITE PROCEDURE—A DEFINITE MEASURE OF RESULTS

By JOHN H. WILLIAMS²

I. INTRODUCTION

THE position of the chief executive is the most important and at the same time the least understood in industry.

To the employe it means the divine right of kings, power and the right of decision.

To the chief executive it too often means that he is the hardest-worked man in the world, and that unless he is everlastingly on the job looking after and watching everything, the business will go to pieces.

It really means those things which through circumstances and environment, the person in question happens to identify with the position of chief executive.

Even the man best suited both in temperament and ability for the position of chief executive is largely dependent upon the circumstance of his environment for what he will do with his ability. This must continue until the position is subjected to the same analysis and specifications as other positions. When a standard has been established, something to live up to, chief executives will be as good as their ability.

Until quite recently most chief executives considered that one of their prime functions was to sign checks. Even today many of them, while having a daily report of cash receipts and disbursements and bank balances, have absolutely no daily information concerning the vital factors constituting the sources from which cash flows.

There has been a vast deal written and spoken about leadership, inspiration, personnel, cooperation, coordination, organization and the like, but it is usually from the viewpoint of the executive in immediate charge of some one function and there is little from

the viewpoint of the chief executive in his coordinated relation to the organization as a whole.

Most chief executives feel unduly embarrassed in asking and taking advice concerning their own functioning from any one short of a chief executive, and the discretion of one, or the lack of interest or disposition of the other, makes this a very poor source.

The Functions of the Chief Executive Susceptible of Definition

I want to put before you tonight the fact that *the job of the chief executive is as concrete as the job of the production manager, the sales manager, and a number of other executives whose functions are hardly less complex though on a different scale.* These positions are not exactly alike in any two enterprises, or even in any two branches of a parent company, but they are fairly well defined as to both principles and methods, and there is little difficulty in adjusting these principles and methods to the exigencies of different cases.

There are reliable sources of information concerning the principles and methods pertaining to each major position under the chief executive, and there is constant discussion and give and take among the executives charged with responsibility in these matters. It is hardly too much to say that it is one's own fault if information concerning these matters and opportunity to discuss them are lacking.

Some of the members of the Taylor Society have felt for several years that the same sort of information and opportunity to discuss the functions of the chief executive should be provided. All were agreed a year ago upon the desirability of forming a section of the Society for this purpose. A committee was appointed, of which I was made chairman, to prepare a program for an early session; but I regret to say the committee has formulated no definite plan up to the present time.

Our chief difficulty has been to get a clearly defined

¹ A paper presented at a meeting of the Taylor Society, New York, Dec. 3, 1921.

² New York Manager, Day & Zimmermann, Inc., Philadelphia.

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idea concerning the exact field which such a section should cover. Some feel that it should include the functions of the comptroller, others the functions of the treasurer, and others, of whom I am one, think it should include the functions of every major executive, *but always from the viewpoint of the chief executive.*

Some, while recognizing the difference in the viewpoint between the chief and a major functional executive, are unable to see that this difference is sufficient to warrant separate discussion. Quite a number, especially the accountants, are unable to see anything in what is suggested other than administrative accounting.

Because of these differences of opinion, and of the impossibility of disposing of them through argument, I agreed to outline what I saw in the position of the chief executive—his responsibilities, his duties, and, primarily, a *method through which he might function effectively.* It is for you to determine whether these things suggest a field for investigation and development along sufficiently different lines from those we have been following to warrant the establishment of a special section of the Society for their discussion.

II. THE FUNCTIONS OF THE CHIEF EXECUTIVE

The function of the stockholders and directors is legislative; that of the chief executive is executive. A stockholder or a director who in that capacity executes, or a chief executive who in that capacity legislates is a failure.

The chief executive, as I see him, is the neck of the bottle through which passes the authority and responsibility established by his directors, and accordingly his functions may be briefly summarized as follows:

1. To interpret the policies of the stockholders and directors in terms of the concrete problems of the enterprise and to represent them.

2. To work out with the directors the objective of the enterprise and the scope and limitations of its activities.

3. To select, appoint and maintain the major executives necessary for the conduct of its affairs.

4. To present the objectives determined upon to the major executives, and to work out with them a plan for their accomplishment evidenced by a budget expressed in the terms of men, money and things, and subdivided according to the responsibilities for its execution.

5. To follow up the activities of the enterprise and

keep the directors informed as to results and their significance.

6. To constitute an available sympathetic and informed counselor to the major executives and to help them to adjust such differences as may arise between them.

7. To keep the major executives informed of each other's accomplishments and help them to see themselves and their functions as part of a whole which is greater than any one of them.

8. To follow up and appraise the work of major executives in terms of their assigned responsibilities and budgets, and to help them to see themselves and their work as their associates see them.

I have said nothing with reference to the issuing of orders or settling of disputes, or in fact the dealing with detailed things at all, as part of the function of the chief executive. These have no place in his duties as chief executive. If a business is small, and he happens to assume detail duties, such service should never be permitted to be confused with his service as chief executive.

No Man Effectively Responsible for What is Beyond His Control

Ability to judge and select men is frequently considered the greatest attribute of a chief executive. In the sense of the word "chief" and omitting the word "executive," this is true; but such a man depends largely upon the executive ability of those whom he selects rather than himself for the direction of his affairs.

This by no means implies any belittling of the man who has the ability to select others to do his work for him. Beyond all question, provided the organization which he serves is big enough and those he selects are made conscious of their responsibility, he is the most valuable man an organization can have; but I think it is a mistake to call him *chief executive.*

The title "Chief Executive" conveys responsibility as well as authority, and no man can be effectively responsible for that which is beyond his individual control. The right to hire and fire does not carry with it the *guidance* implied in effective control, which should be the basis of all direct responsibility and the essence of the function of the executive.

The position of the chief executive has two distinct phases:

- A. Functions.
- B. Methods.

The latter phase is the one under special consideration to-night. I have referred to the former only because without a brief statement of the "Functions," one cannot judge the effectiveness of the "Methods" to be described, and there is not time in one evening to deal with both. Methods are the least understood, and without them there can be little hope of realizing one's objectives, regardless of the wisdom of a plan or the spirit of its execution.

III. METHODS FOR THE CHIEF EXECUTIVE

Methods may be defined as a means whereby:

All the facts are made available.

Policies and plans are co-ordinated and expressed.

Results are fairly appraised.

Causes and responsibilities are traced.

There is probably no one thing which will be shown you to-night of which you have not seen an equivalent. I want to make it clear that I am not interested in these *separate* phases, or alternatives for them, but in their *co-ordinated relation as a whole*.

Most of the methods in common use have come from the bottom up, and consequently are limited to the scope and objectives of the departments for which they were designed. They are like the different monetary systems of the world.

It is generally recognized that it would be a great advantage were all the enterprises within an industry to keep their books alike. An effort in this direction has been made by the Interstate Commerce Commission with reference to the railroads. It is this sort of thing carried, however, beyond conventional accounting to *duties and responsibilities and the co-ordinating of functions* that I have in mind. The object of to-night's talk is to present the outstanding features of the evolution of big business in this direction, and to present them in their co-ordinated relation so that one may *see them as a whole*.

Accounting as a clearly defined technique is much older than management and developed an integrity of its own long before management can be said to have existed as anything more than an undifferentiated faculty. This accounts for a certain domination which accountants have exercised over owners, if not over managers. To-night, however, one may see the clear domination of management, without the sacrifice of any fundamentals of good accounting.

The chief executive of the past has been a victim of his organization. Its ramifications have been so

many and varied as to make it impossible to unify them. He has, of necessity, spent much of his time in "figuring exchange," as it were.

This was necessarily the case until each unit could become sufficiently developed to demonstrate its needs. These needs are now well known, and the time has come when we must reduce them to the smallest number of common functions and denominations, that the chief executive may more easily co-ordinate them and have time for those broader features of his position which are coming into strong relief as the confusion of pioneer work clears away.

As a first step, responsibilities and duties must be more clearly defined and all results expressed in common terms. For instance, the statement for the chief executive can and must be *literally a copy of the summing lines of the statements of those executives to whom he has delegated duties and responsibilities, added together*, if he is to be effective as chief executive.

To accomplish this, one must first find some form of expression of results suitable alike to *all* subdivisions of an enterprise, and at the same time such as to enable the setting of standards, *readily adjusted to the changing conditions of industry*, by means of which these results may be judged.

Profits and losses will not do. They are affected by too many things. They are in their nature a final result; by the time we get them it is too late. What we want is information with reference to the things antecedent to profits and losses—from which profits and losses result—while there is yet time to affect them.

If you had to motor to Tarrytown, a distance of some thirty miles, in an hour, while your watch would tell whether you got there in the hour, it would be of no help in determining your progress while there was still time to affect it. If, when the hour was up, you had not reached Tarrytown, you would be in the same position as the executive who must wait until a loss is irretrievably made before he discovers that he has been losing.

But if you had a speedometer, the moment your speed slackened to less than thirty miles an hour, even though it were in the first mile, you would know you must make up this lost time if you are to get to Tarrytown in the hour.

Similarly in industry we must know the costs from week to week or month to month, and *always with reference to revenue*, if we are to have any assurance as to how we will come out at the end of the year.

ELEMENTS OF COST		THE BEST BUSINESS			
Fixed Cost	\$120,000.00 per month	Per Cent of Profit on a Given Volume of Business is not a Safe Guide for the Appraisal of an Industry			
Variable Cost	.80 per dollar of sales	The four following businesses all have the same profit of \$3,000,000 on \$30,000,000 of business, yet have different potentialities in the event of increase or decrease of business.			
Contribution to Fixed Cost and Profit	\$1.00				
DEFINITIONS		ALL EARN \$3,000,000 ON \$30,000,000 BUSINESS			
Fixed Cost: - That part of cost which exists irrespective of fluctuations in volume of business within a range of the smallest volume of business which there is reasonable probability of doing up to the practical capacity of the plant.		DIFFERENT BREAKING POINT IN EACH CASE			
As: rent, depreciation; salary of executives, and a minimum number of accountants and clerks; payroll for shop superintendents, foremen, watchmen, etc.; property and corporation taxes; interest on funded debt; etc.		IF BUSINESS FALLS TO \$25,000,000			
It should represent only such items and parts of items as are regarded as essential to the conduct of the business at the established minimum volume and are independent of fluctuation because of increase or decrease in volume of business.		IF BUSINESS INCREASES TO \$35,000,000			
Variable Cost: - That part of cost which should vary in proportion to the volume of business.		*000 omitted throughout			
As: materials; direct wages; supplies; upkeep; salary of minor executives, accountants and clerks; payroll of assistant shop superintendents, foremen, etc.; income taxes; interest on floating debt; stock dividends; etc.		THE BEST BUSINESS is the business with the lowest Variable Cost consistent with a breaking point below the smallest volume of business which there is reasonable probability of doing.			
It should represent only such items and parts of items as are not essential to the functioning of the business on the basis of the established minimum.					
Under conditions of a falling volume these items should constitute a schedule for curtailments.					
Contribution to Fixed Cost and Profit: - The difference between the Variable Cost and sales value at list.					

Exhibit A

Exhibit B

To know that the cost of something is \$5 or \$5,000 per day or per month is not sufficient. We must know costs in terms of *per dollar of revenue*, just as the motorist knows his mileage in terms of *per hour*.

The idea back of this form of expression of cost was presented in Mr. Taylor's use of the term "Limit Cost," and also in some of the later work of Mr. Gantt, but neither of them made a clear exposition of it or gave us a formula for its use.

The purpose of to-night's talk is to apply this concept of cost to the problem of the chief executive, and to show how through it and the formula which I shall give you, he may maintain a controlling knowledge of his enterprise comparable to that obtained by the motorist through his speedometer.

Before doing this, I must say a word about costs in general and the properties of certain elements of costs.

1. ELEMENTS OF COST

There are two conflicting elements of cost, the confusion of which is at the bottom of a large part of our business troubles:

Variable Cost—That part of cost which varies in proportion to the volume of business done.

Fixed Cost—That part of cost which exists irrespective of the volume of business done.

If we divide our costs into these two elements and think of and deal with them separately, we avoid many dangers which result from confusing them.

The term "Fixed Charges" is ordinarily used to indicate interest on bonded or other indebtedness having the right of foreclosure in the event of not being paid. It is very seldom figured as an operating expense for the reason that it has no relation to the extent or nature of the operations. The theory is that all other expenses are more or less affected by the extent or nature of the operations.

The fact is that there are a number of expenses which are just as fixed in every sense of the word as interest on mortgage indebtedness, and by overlooking any one of these we create the very confusion that we seek to avoid in segregating interest on mortgage indebtedness. If we are consistent in dividing all of our costs into the foregoing elements, we find our whole problem of administrative accounting wonderfully simplified.

If the variable cost varies in amount with the volume of business but is always the same per cent of the business done, while the Fixed Cost stays fixed regardless of the volume of business, then the difference between the per cent of Variable Cost and one hundred

per cent (as representing the business done) may be called the Contribution to Fixed Cost and Profit.

In other words, if the Variable Cost is 75 per cent or \$.75 out of each dollar of business, there must be \$.25 out of each dollar of business applicable to Fixed Cost until it is offset, and thereafter to Profit; and if the Fixed Cost should be \$10,000 a week, it will take a business of four times this amount, or \$40,000 in each week, to break even; and we shall make or lose \$.25 on each dollar of business more or less than \$40,000 in each week.

To make sure that we have a common understanding at this point, which is essential to to-night's talk, I ask you to set aside your own and the dictionary meaning of three phrases I shall use, and to accept the meanings given on the exhibit I now show you.

Exhibit A—Subdivision of Cost for Purposes of Standards and Operating Reports

Please read every word on this exhibit carefully.

To make sure that you understand exactly how these elements affect total costs and profit and loss, I shall ask five questions and figure out the answers to these on the blackboard.

Q.—Assuming the Fixed Cost and Variable Cost to be as indicated at the top of Exhibit A, how much business would it be necessary to do to break even?

A.—If the Variable Cost is \$.80 of every dollar of sales, obviously there is only \$.20 of each dollar of sales applicable to Fixed Cost. Therefore, to find the breaking point, or point at which there will be neither profit or loss, we divide \$.20 into \$120,000 which gives us the answer of \$600,000 per month as the breaking point.

$$\begin{array}{r} .20 \overline{) \$120,000} \\ \$600,000 \end{array}$$

1-10
FC

Q.—Assuming the same conditions, if certain economies are affected which reduced the Fixed Cost \$40,000, how much business will it be necessary to do to break even?

A.—This means that the difference between the Variable Cost and each dollar of sales remains the same as before, \$.20, but the Fixed Cost is reduced from \$120,000 to \$80,000; so we go through the same process, using however the smaller Fixed Cost. The answer is \$400,000 per month.

$$\begin{array}{r} .20 \overline{) \$80,000} \\ \$400,000 \end{array}$$

FC

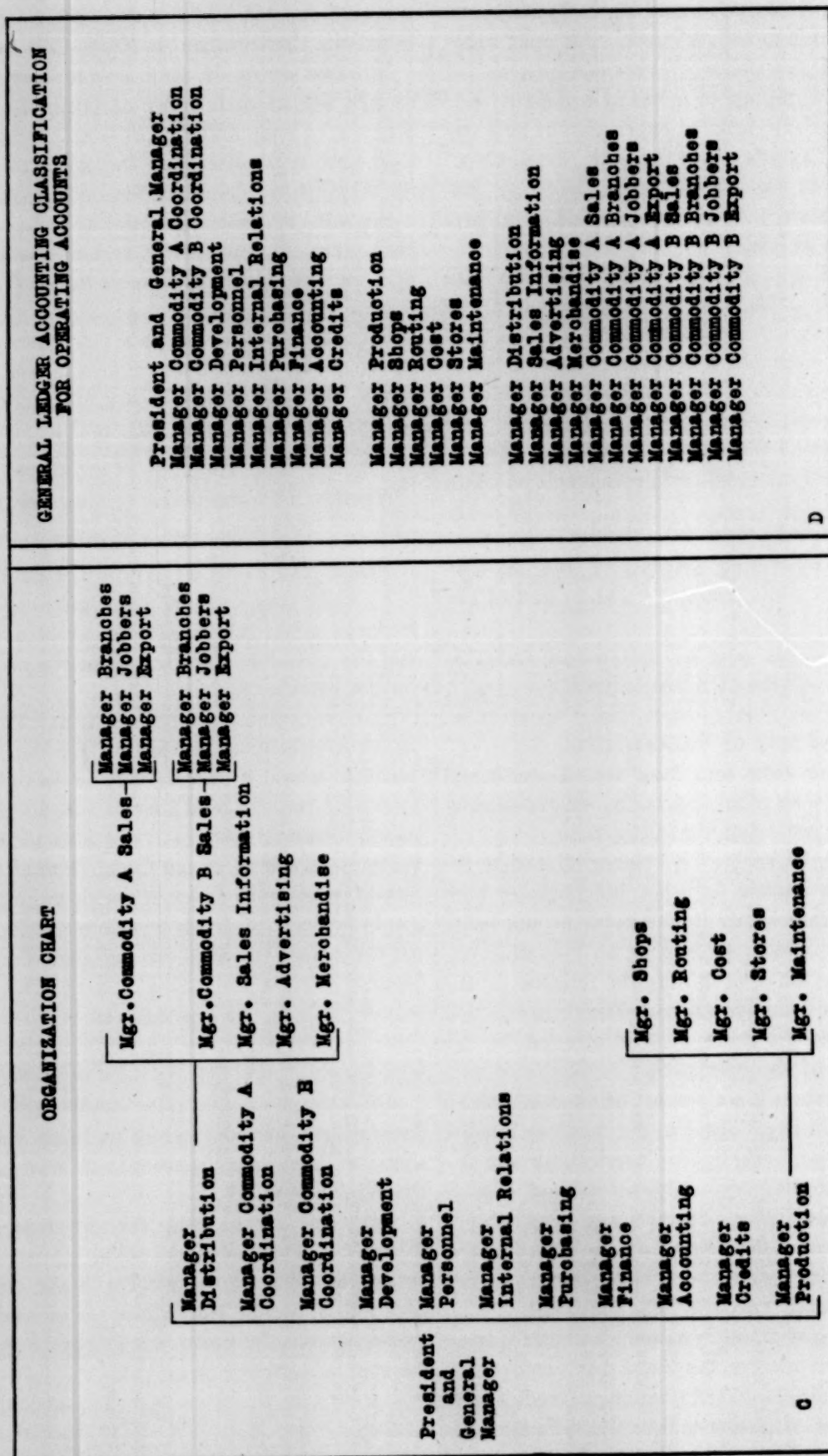


Exhibit D

Exhibit C

Q.—Assuming the same conditions; if instead of the economies in Fixed Cost the Variable Cost is reduced to \$.70 on each dollar of sales, how much business will it be necessary to do to break even?

A.—If the Variable Cost is reduced to \$.70 on each dollar of sales, then we have \$.30 on each dollar of sales applicable to Fixed Cost. Accordingly we divide \$.30 into \$120,000. The answer is \$400,000 per month.

$$\begin{array}{r} .30 \overline{) \$120,000} \\ \$400,000 \end{array}$$

Q.—Assuming the same conditions, how much would our loss be if we should do \$500,000 business per month?

A.—Since we get a contribution to Fixed Cost and Profit of \$.20 on each dollar of sales, we would have a total contribution of \$100,000, and since our Fixed Cost is \$120,000 we would lose \$20,000 per month.

\$500,000	\$120,000	Fixed Cost
.20	100,000	Total Contribution
\$100,000.00	\$20,000	Loss per month

Q.—Assuming the same conditions, how much would our profit be if we should do \$1,000,000 business per month?

A.—Following the same procedure as in the foregoing question, we would make \$80,000 per month.

\$1,000,000	\$200,000	Total Contribution
.20	120,000	Fixed Cost
\$200,000.00	\$80,000	Profit per month

To emphasize the full significance of this subdivision of costs, the next exhibit shows how four businesses, each doing the same volume of business—\$30,000,000 per annum—and making the same profit—10 per cent or \$3,000,000 per annum—might have very different potentialities.

Exhibit B—The Best Business

The fact that an enterprise has earned 10 per cent on a business of \$30,000,000 is not in itself sufficient to warrant an opinion concerning what that enterprise can do on any other volume of business.

To say that an enterprise has a Variable Cost of 70 per cent and a Fixed Cost of \$6,000,000 means not only that it will make 10 per cent on \$30,000,000 of business, but also that it will break even on \$20,000,000 and will make different percentages of profit according to the amount of business done from \$20,000,000 up to its capacity.

On \$25,000,000 it would make \$1,500,000 = 6 per cent.

On \$30,000,000 it would make 3,000,000 = 10 per cent.

On \$35,000,000 it would make 4,500,000 = 13 per cent.

If I were given a choice of the four businesses shown on Exhibit B, assuming that the smallest volume of business which there was reasonable probability of doing was \$20,000,000 and that the practical capacity of the plant was \$35,000,000, I would select business B. If, however, there was probability of the business falling to as little as \$15,000,000, I would select business A; or if, on the other hand, there were little danger of its going below \$25,000,000, I would select business C or even D.

As is stated at the bottom of the exhibit; *The best business is the business with the lowest Variable Cost consistent with a breaking point below the smallest volume of business which there is reasonable probability of doing.*

For the present I shall drop this subject and take up certain features of organization which must go hand in hand with it for either to be fully effective.

2. UNIFICATION OF RECORDS WITH REFERENCE TO RESPONSIBILITY

Exhibit C—Organization Chart

This is a simple organization chart, but the principle it illustrates is applicable to any enterprise regardless of its limitations or ramifications.

First, consider what an organization chart is. No two or more men can function together effectively without an agreement and understanding concerning their respective responsibilities and duties. An organization chart is nothing more nor less than a conventional means of recording and making clear the responsibilities and duties of the persons constituting the organization.

If the organization chart represents the units of responsibilities and duties upon which the success or failure of the enterprise depends, then obviously it represents the units in which all costs and records should be kept if the chief executive is to exercise an effective control over the situation. If responsibilities and duties are assigned on one basis and records kept on another, one might as well try to check with a bushel basket something bought by the pound. That is what is unconsciously being done in many of the best organizations.

In making a report on a very large and successful organization, we recently recommended that the classification of operating accounts be changed to conform

to the organization chart. The chief executive insisted that he already had this, that there was an account in the ledger for each major production department and for the sales, purchase, accounting, and in fact, every department. He was somewhat annoyed and said he could not imagine how else one would keep one's accounts.

Exhibit D.—General Ledger Accounting Classification for Operating Accounts

We have here the same organization units as appeared in the organization chart (Exhibit C), except that they are written in a single column as representing the Operating Accounts Classification for the same organization.

When such a list had been made from the organization chart of the chief executive mentioned above, we asked that he send for his accounting classification and compare the two. He tried for a while to prove that they were in effect the same, but he soon acknowledged that they were not.

It is true that most organizations have their accounts so arranged that all expenditures ultimately find their way to some one or another major responsibility. *But I mean something very different.* I mean that every expenditure should go at once to that organization unit of which the head is responsible for the expenditure, and should stop there.

The name of the organization unit and the name of the ledger account should be the same, and they should be synonymous for John Smith or Bill Brown or whoever is in responsible charge of the organization unit in question. Further, no part of any expenditure for rent, insurance, interest or any other item which the organization unit head himself does not arrange for, and in effect pass the bill for, should be prorated to him; and no part of any expenditure for which he is responsible should be prorated to the unit of someone else.

The *individuals* to whom responsibilities and duties are allocated are the principal sources of success or failure. Unless records are kept in terms of these sources, the chief executive has no effective means of judging the results in terms of responsibility.

Not many years ago chief executives spent most of their energies in worrying and struggling over results. To-day results receive principal consideration as a basis for determining causes. While the doctor of ten years ago treated rheumatism as such, the doctor to-day analyzes back to and treats the teeth or digestion as

the cause of the rheumatism.

In the same way the chief executive of the past studied the cost and effectiveness of departments as such. To-day he studies the cost and effectiveness of the individuals charged with the duties and responsibilities which constitute the department.¹

How often have you, finding the cost of certain results high, sought to place the responsibility for these costs and found yourself foiled at every turn by divided responsibility. Briefly stated, every expenditure should be definitely charged to the person having immediate responsibility for making it.

An accounting classification made by anyone other than the person who determines duties and responsibilities, or made in advance of the determination of duties and responsibilities, is prima facie an ineffective accounting classification.

3. SETTING OF MANAGEMENT STANDARDS

Assuming that it has been arranged that all expenditures shall be charged according to the organization unit, which is merely another way of saying the individual directly responsible for the expenditure, how then is the chief executive to judge the expenditure? He obviously cannot go sufficiently into detail to have a valid opinion whether it should be say \$29,700 or \$32,500 for the month; yet the difference between these two figures multiplied by ten or one hundred responsibilities goes into a goodly sum.

What is needed is a budget or standard for each organization unit, which is another way of saying for each responsibility, which is easily adjustable to the varying conditions of industry. It is impossible to say in advance whether we shall do a business of one amount or another, and it is equally impossible to say what the price which we shall receive for our goods or the price which we shall pay for our materials will be. Therefore, a budget or standard to be effective must be adjustable in all of these particulars.

The first standard which must be set is that for the expected volume of business in each of the various units of product. I cannot go into the method of setting this standard because it is in itself a subject big enough for an evening's talk, but I think most of you

¹ This does not mean that each responsibility can have only one account, but that each of such accounts as it may have shall have a prefix indicating the organization unit responsible for the expenditures charged to it. *The fundamental thing behind the classification of an expenditure should be the responsibility for the expenditure rather than the expenditure itself.*

COMMODITY A 1 : MATERIAL AND DIRECT LABOR COST TO LIST PRICE								
Revised to _____								
Item	Quota	List Price		Material Cost		Direct Labor Cost		Mat. & Labor To List
		Unit	Total	Unit	Total	Unit	Total	
Com. A 1 A	25,739	\$1.85	\$ 47,617.15	\$.6675	\$ 17,180.78	\$.3448	\$ 8,874.81	.5472
" A 1 B	95,390	1.70	162,163.00	.5857	55,869.92	.3411	32,537.53	.5451
" A 1 C	101,510	1.55	157,340.50	.4761	48,328.91	.3372	34,229.17	.5247
" A 1 D	15,915	1.70	27,055.50	.5858	9,323.01	.3356	5,341.07	.5420
" A 1 E	5,773	1.45	8,370.85	.4704	2,715.62	.3078	1,776.93	.5367
" A 1 F	31,238	1.35	42,171.30	.3652	11,408.12	.3056	9,546.33	.4969
Total A 1	275,565		\$444,718.30		\$144,826.36		\$92,305.84	.5332
E					.3256 to List		.2076 to List	

Exhibit E

have passed the point of arguing whether it can or cannot be done, for it is now being done by every concern which has made much progress in the evolution of a conscious technique of management.¹

One point, however, I think I should stress because there is considerable misunderstanding with reference to it; and that is that in setting such a standard the purpose is not to guess what the result will be, but to establish a reasonable expectancy by which the actual result may be judged. This point cannot be over-emphasized.

If you know certain conditions which should not exist but none the less probably will exist and affect results, even though you take these conditions into consideration in setting your standard, the setting of standards represents nothing more than a guessing contest and is of no value from a management standpoint.

The purpose of setting standards is to determine a reasonable expectancy under conditions which should and can be made to exist, as constituting a yard stick by means of which you may measure the degree of effectiveness of the individuals to whom certain responsibilities and duties have been assigned.

Assuming that we have established our expectations in the matter of sales, which constitute our standard for sales, we may proceed to the setting of other standards on the basis of these sales. In the setting of the

remainder of the standards there is no prescribed sequence, for each one is useless without all the rest. Therefore, let us start with material and direct labor costs.

Exhibit E—Sales Quota and Material and Labor Costs by Groups

This exhibit represents a certain group of articles which we call Commodity A 1. All commodities should be grouped according to their general type and then sub-grouped according to the proportions of materials and labor contained in them. In this particular group we have six articles. In the first column we have the symbols of the different articles, in the second the number of each article which we have set as the sales standard or quota, in the third the unit list price, and in the fourth the gross revenue to be received for the standard quantity at the unit list price. The footing of the fourth column gives us the total of sales or the sales quota for this group of articles. In the fifth column we have the cost of the material in a single unit, and in the sixth the total cost of material for the quantity in column two. The footing of column six gives us the material cost of the standard total sale of this group of articles. Dividing this by the total sale, we find that the cost of material will be \$.3256 out of each dollar of sales. Direct labor is dealt with in the same way, and we find that the cost of direct labor will be \$.2075 out of every dollar of sales.

¹ See *Bulletin of the Taylor Society*, October, 1921, Vol. VI, No. 5, pp. 194-213.

COMMODITY SUMMARY: MATERIAL AND DIRECT LABOR COST TO LIST PRICE						
Revised to _____						
ITEM	Value of Product	Material Cost		Labor Cost		Material and Labor to List
		Amount	Per Cent	Amount	Per Cent	
Com. A 1 (E)	(E) \$ 444,718	(E) \$ 144,826	(E) .3256	(E) \$ 92,305	(E) .2076	(E) .5332
" A 2	300,000	84,174	.2805	54,000	.1800	.4605
" A 3	150,000	45,000	.2866	25,000	.1700	.4566
" A 4	105,282	31,000	.2949	20,195	.1922	.4871
" A 5	1,200,000	400,000	.3333	252,000	.2100	.5433
" A 6	1,800,000	360,000	.2000	300,000	.1666	.3666
" A 7	500,000	110,000	.2200	100,000	.2000	.4200
" A 8	1,500,000	390,000	.2600	320,000	.2133	.4733
" A 9	2,000,000	440,000	.2200	360,000	.1800	.4000
etc.	etc.	etc.	etc.	etc.	etc.	etc.
Com. B 1	4,000,000	1,347,000	.3367	850,000	.2125	.5492
" B 2	1,000,000	230,000	.2300	200,000	.2000	.4300
" B 3	500,000	75,000	.1500	120,000	.2400	.3900
" B 4	1,000,000	160,000	.1600	172,000	.1720	.3320
etc.	etc.	etc.	etc.	etc.	etc.	etc.
Com. C 1	3,000,000	700,000	.2333	618,000	.2060	.4393
" C 2	1,700,000	357,680	.2104	289,000	.1700	.3804
etc.	etc.	etc.	etc.	etc.	etc.	etc.
Total F	\$30,000,000	\$7,500,000	.2500	\$6,000,000	.2000	.4500

Exhibit F

In setting the value of the material and labor, the object is to set what it should be at certain prescribed schedules of prices. If you happen to know that certain departments, processes or people are wasteful or inefficient, *do not make allowance for these facts*. The purpose in setting standards is to determine not merely the fact of efficiency or inefficiency but also the degree. Where formal time studies and material studies exist, these should be used. Where they do not, ordinary estimates may be used, but the advantage of the more accurate figures is much greater than their cost. The manner in which these costs may be adjusted from month to month as prices of material and wage rates change will be explained later on.

In the last column is given the combined cost of material and labor to each dollar of sales. The purpose of this column will be explained in connection with Exhibit M.

Exhibit F.—Total Sales Quota and Material and Labor Cost

This exhibit represents a summation of totals of a number of separate sheets, like the preceding Exhibit E, each total representing a group of commodities. The figures in Exhibit F which were taken from Exhibit E are identified by an E in parenthesis—(E).

The footings of Exhibit F show an average material cost for the entire list of commodities of \$.25 on each dollar of sales, and an average labor cost of \$.20 on each dollar of sales. The average material and labor cost is \$.45 on each dollar of sales. Certain groups range as high as \$.54 and one as low as \$.33 on the dollar. These represent extreme variations from average of 9 points up and 12 points down.

This difference in cost of material and labor constitutes the principal difference in total cost of the different groups of commodities. In order to appreci-

ate fully the part which this record serves in the determination of price and policy, it might be well to refresh your minds concerning what may be termed common practice among the better managed concerns in determining individual prices within a large group of commodities.

Unit sales prices are not always based upon unit costs, as is generally supposed; in fact, under our modern competitive system, costs are seldom considered until after a practicable sales price has been determined. In the average industry, such as I am now describing, the steps in making sales prices are as follows:

1. List all of the articles.
2. Determine the articles with which these will compete, and head up a column for each of the principal competitors.
3. Fill in the price at which these competitive articles are sold.
4. Determine and fill in the price, under the circumstances of your sales campaign, at which you believe you can produce the desired volume of sales.
5. Put down your own unit costs.
6. Review all of the facts and make such unit prices as you believe necessary to the end of producing the most favorable aggregate result.

With this procedure in mind, it will readily be appreciated that certain items may be priced so as to make them leaders and others may be priced high or low according to various particular circumstances.

Exhibit F constitutes the basic information upon which the unit costs referred to in Item 5 above are based. It also serves in adjusting standards to current fluctuations in sales price and material and labor costs. This will be explained in connection with Exhibit M.

Exhibit G—A Flexible Budget

This exhibit represents a budget covering the cost of exercising the responsibilities and performing the duties necessary to the supervision and direction of sales of Commodity A to jobbers.

You will notice that each item on this exhibit has been extended twice, once under "Cost of Minimum Sales" (representing the smallest volume of business there is probability of doing), and once under "Cost of Maximum Sales" (representing the practical capacity of the plant). The reason for this will be explained when we come to set standards; but apart from everything else, the fact of having to set standards for two different volumes of business is a good check in itself.

You will also notice that the items of cost have been

subdivided in each case under three headings, the meaning of which is explained at the bottom of the exhibit.

The reason for this subdivision of cost is because they present the items in which we necessarily think of cost in connection with the functioning of an organization unit of this character, and we are always seeking to resolve things into the elements of which they are composed and to avoid artificial subdivisions containing a variety of elements.

Whatever other subdivision of expenditures we might make would necessarily be composed of the following three elements: First, the individuals necessary to carry out the work; second, the physical things consumed in the doing of the work; and third, the services of one kind or another rendered by outside agencies for which we must pay. If these are the elements with which we must deal, why not simplify matters by accepting them as our subdivision of expense?

A recent experience illustrates a by-product advantage of making budgets of this character.

In connection with an investigation and report on an enterprise of considerable size, we recommend, along with other things, the making of budgets similar to this exhibit for each organization unit.

In talking with one of the executives about six months later, he said that the company had made a substantial reduction in its clerical and miscellaneous expenses in the process of making these budgets; that the chief executive had made each one of them figure out with him why it should cost so much to fulfill the different responsibilities and duties he had assigned, and had expressed some surprise that we had not said anything of the possibility of this saving in our report.

To have criticised the department heads for their clerical and miscellaneous costs would have accomplished nothing. In doing so, we would have been dealing with a result. Our recommendations dealt with the causes back of the result.

4. FORMULA FOR EXPRESSING UNIT COSTS IN TERMS OF PER CENT OF SALES.

Exhibit H—Operating Standards

The first column of this exhibit is a list of the organization units, which is merely another way of saying a list of the individuals to whom the responsibilities and duties necessary to the conduct of the enterprise have been assigned. You will remember we are using these as the accounting classification.

The figures under the heading "Range" are taken from Exhibit F and a number of sheets, one for each

OPERATING STANDARDS - For Period January 1st, 1921 to _____ (Expressed in thousands)									
ITEMS	COST FOR MINIMUM SALES			COST FOR MAXIMUM SALES			RANGE		
	Emplymt	Physical	Service	Total	Emplymt	Physical	Service	Total	Per cent
Jobbers Discount 10%				700.0					
Bad Debts				7.0					
Rebates & Allow 0.15				7.0					
1 Manager				12.0					
3 Sec. Supervisors				15.0					
4 Secretaries				7.0					
5-10 Clerks				8.0					
1-2 Boys				.5					
9-12 Salesmen				45.0					
Off. Supplies-Stores				1.0					
" " Special				2.0					
Job-Sales Literature				30.0					
Postage				5.0					
Telephone				2.0					
Sales Travel				22.0					
Executive Travel				5.0					
Sales Bonuses				21.0					
Executive Bonuses				14.0					
Miscellaneous				3.5					
Total	122.5	33.0	749.5	905.0	181.0	52.5	1,476.5	1,710.0	
(Expressed in thousands)									
Employment: - Salaries, commissions and bonuses of every kind from chief executive to laborer or office boy when paid to an individual regularly employed by the company. Physical: - All physical things purchased outright and consumed or disposed of in the conduct of the business, as raw and manufactured materials, supplies, printed matter, office stationery, etc. Service: - All items in the nature of service rendered by others than regular employees of the company, as royalties, rents, interest, discount, telephone, telegraph, transportation, food, lodging, etc. Notes: - In determining both the items and amounts in making of budgets, avoid the natural tendency to prediction. Keep constantly in mind the essential fact that the task is to set a standard of what can and should be done rather than what will be done. Avoid reference to past experience until you have first determined tentative standards on the basis of practical possibility. Past experience should be used as a test and not as a basis.									

Exhibit G

Exhibit H

ITEMS	Minimum			Maximum			Cost Standards		
	Sales	Cost	Year	Sales	Cost	Year	Fixed	Month	Variable
Pres. & Gen. Mgr.									
Com. A Cor.									
Com. B Cor.									
Development									
Personnel									
Int. Relations									
Purchasing									
Finance									
Accounting									
Credits									
Production	15,000	3,250	30,000	4,000	2,500	208,333			.0500
Shops									
Boating									
Cost									
Stores									
Maintenance									
Production Overhd.	15,000	3,250	30,000	4,000	2,500	208,333			.0500
Materials (P)	15,000	3,750	30,000	7,500	none	none			.2500
Direct Labor (P)	15,000	3,000	30,000	6,000	none	none			.2000
Production	15,000	10,000	30,000	17,500	2,500	208,333			.5000
Distribution									
Sales Infor.									
Advertising									
Merchandise									
Distribution Overhd.		635		1,070	200	16,667			.0250
Com. A Sales	9,250	19	18,500	28	10	.833			.0010
Com. A Bran.	2,000	490	4,000	770	210	17,500			.1400
Com. A Jobb. (G)	7,000	905	14,000	1,710	100	8,333			.1150
Com. A Exp.	250	87	500	94	30	1,667			.1480
Com. B Sales	5,750	16	11,500	22	10	.833			.0010
Com. B Bran.	4,000	840	8,000	1,280	400	33,333			.1100
Com. B Jobb.	1,000	175	2,000	330	80	1,667			.1850
Com. B Exp.	750	113	1,500	196	30	2,500			.1107
DISTRIBUTION	9,250	3,250	18,500	5,000	1,000	83,333			.1600
FOOTING	15,000	16,500	30,000	27,000	6,000	500,000			.7000
Column No.	A	B	C	D	E	F			G
Per cent Variable Cost - (D minus B) divided by (C minus A) Fixed Cost - (B minus A) multiplied by G Proof - C multiplied by G plus E should equal D									

Exhibit G

Exhibit H

organization unit, like the preceding Exhibit G. The figures taken from these particular exhibits are indicated by the initials (G) and (H) in parentheses in the left column.

The figures under the heading "Cost Standards" are computed from those under "Range" by the formula referred to in connection with Exhibit A.¹

The purpose of this formula is to enable one to determine the dividing line between Fixed Cost and Variable Cost. In other words, given the total minimum and total maximum cost for the conduct of an enterprise or any unit of it, this formula furnishes a means whereby one may determine what part of such cost is fixed and what part is variable within the meaning of these words as given in connection with Exhibit A.

The formula itself, expressed in every-day terms, appears at the bottom of this exhibit; but to make it even clearer, I shall go over the figuring to cover the total costs taken from Exhibit G, (see line with (G) in left column) into terms of Fixed Cost and Variable Cost.

If we deduct the minimum sales from the maximum sales, we find that there is a variation in sales of \$7,000,000. If we deduct the minimum cost from the maximum cost, we find there is a variation in the cost of \$805,000. If we divide the variation in sales into the variation in costs, we find that the Variable Cost is 11.5 per cent of the sales.

	Sales	Cost
Maximum	\$14,000,000	\$1,710,000
Minimum	7,000,000	905,000
Difference	\$7,000,000	\$805,000
	<u>\$7,000,000) \$805,000 (.115 per cent Variable Cost</u>	

The Variable Cost being 11.5 per cent of the sales, if we take 11.5 per cent of either the minimum or the maximum sales and deduct that amount from the corresponding total cost, the difference must be the Fixed Cost.

	Minimum	Maximum
Sales	\$7,000,000	\$14,000,000
Multiply by per cent of Variable Cost	.115	.115
Product is Variable Cost	\$805,000	\$1,610,000
Total Cost	\$905,000	\$1,710,000
Variable Cost	805,000	1,610,000
Difference is Fixed Cost	\$100,000	\$100,000

¹ In practice the blank space in the top half of Exhibit H would be filled in. The figures between the double hairlines represent the aggregate of figures assumed to exist in the blank spaces above them.

This gives us Fixed Cost of \$100,000 per year, or \$8,333 per month, with Variable Cost of 11.5 per cent of sales which we fill in on the line identified by (G) in the column "Cost Standards."

With reference to the figures for materials and direct labor taken from Exhibit F, these figures, fluctuating uniformly with the volume of business, represent Variable Cost only; and since the per cent of these figures with reference to sales was determined on Exhibit F, there is nothing for us to do but to fill in the per cents in the last column under "Cost Standards." There is no Fixed Cost in connection with material or direct labor so there can be no figures to be filled in.

From these examples it will readily be seen how all of the figures under "Cost Standards" can be computed from those under "Range"; and also that when these figures have been filled in and are added up, we have the total cost for the conduct of the enterprise *subdivided into the units of responsibilities and duties upon which the activities of the enterprise are based.*

Having established a standard for each and every separate responsibility and listed these standards and added them up, the chief executive is informed not only of the facts that his total Variable Cost should be \$.70 of each dollar of sales, his Fixed Cost should be \$.6,000,000, that he must do \$20,000,000 business before he can commence to make anything, and that thereafter he should make .30 out of every dollar of sales, *but he knows also exactly what part each responsibility should play in obtaining these results.*

You will have observed that all subdivisions of expenses as between a number of different accounts has been done away with. Rent is all charged to the organization unit responsible for relations with the landlord, insurance to the organization unit responsible for relations with the insurance agent, and so on.

Under this plan the only journal entries to be made at the end of the month before an operating statement can be made are those which are common at the end of every month; that is, those in connection with depreciation, fixed charges, etc. Therefore, if all expenditures clear through a voucher register, as can easily be arranged, there is no need for waiting at all beyond the writing up of the first entry books for the chief executive to have actual figures corresponding to each of the standards established on the exhibit before you.

You know what it is to wait until the middle or the end of the month for an operating statement of the preceding month. This wait is usually because it is desirable to get a trial balance and to make a number of

<u>ORGANIZATION UNIT:</u> Manager Commodity A Jobbers.					<u>LEDGER ACCOUNT:</u> Manager Commodity A Jobbers					
<u>SCOPE OF EXPENDITURES:</u> Supervision and Direction of Sales of Commodity A to Jobbers										
<u>VARIATION FROM STANDARD:</u> \$8,333 per month Fixed Cost and 11.5 per cent Variable Cost										
MONTHS	SALES		ACTUAL COST		STANDARD COST		VARIATION TO DATE			
	Month	To Date	Month	To Date	Month	To Date	Good		Bad	
							Amount	Percent	Amount	Percent
Jan.	1,000,000	1,000,000	122,333	122,333	123,333	123,333	1,000	.0010		
Feb.	1,000,000	2,000,000	126,333	248,666	123,333	246,666			2,000	.0010
Mar.	750,000	2,750,000	98,583	347,249	94,583	341,249			6,000	.0022
Apr.	1,000,000	3,750,000	128,333	475,582	123,333	464,582			11,000	.0030
May	750,000	4,500,000	100,583	576,165	94,583	559,165			17,000	.0038
June	1,000,000	5,500,000	128,333	704,498	123,333	682,498			22,000	.0040
July	500,000	6,000,000	76,833	781,331	65,833	748,331			33,000	.0055
Aug.	1,000,000	7,000,000	129,333	910,664	123,333	871,664			39,000	.0058

Exhibit J

closing entries dependent upon the current expenditures of the month, before making a statement.

In accordance with the methods I am describing to you to-night, all that you have to know to make an operating statement is the amount of the debit and credit charges for the month subdivided according to the organization units responsible for the transactions out of which they have grown.

The setting of standards by means of which any particular month's operations may be judged is merely a matter of a computation of Fixed Cost and Variable Cost according to Exhibit H on the basis of the volume of business done, the price received for the product, and that paid for materials and labor. How these adjustments are made will be shown in connection with the next exhibit.

This covers the three basic principles which should underlie any method of management through which the chief executive can exercise effective control:

1. The expression of all results in common terms, that is, so that the statement of the chief executive is literally merely a copy of the last lines of the statements of those to whom he has delegated responsibilities and duties, added together.

2. The classification of expenditures according to responsibility for each transaction out of which they have grown, as distinguished from the nature of the expenditure itself.

3. The establishment of flexible standards which are readily adjusted to changing conditions in volume of business, price of product, and cost of material and labor.

The rest of what I shall say will be with reference to the application of these principles.

5. USE OF STANDARDS IN JUDGING MANAGERIAL EFFECTIVENESS

Exhibit J—Unit Operating Reports

This is an operating statement for an organization unit; that is, a certain group of responsibilities and duties. The "Sales" we get in the usual way by adding the sales book. The "Actual Cost" we get as just explained by adding the corresponding column in the voucher register book. We do not have to wait for journal entries to be made, the ledger to be posted, or for a trial balance to be taken off.

With reference to the "Standard Cost": Turning to Exhibit H we find that the Fixed Cost of this organization unit (the line identified by (G) in the left column) is \$8,333 per month and the Variable Cost is 11.5 per cent of the sales. You will note that these figures have been filled in on the third line of the heading of this exhibit.

Dealing with the "Standard Cost" for the month of August, by which we mean the total standard costs for the volume of business done in August, we find that the sales for the month were \$1,000,000 and that 11.5 per cent of this is \$115,000, to which we must add the Fixed Cost of \$8,333 giving us a total for the month of \$123,333.¹

¹ Naturally a statement made in this way, say on the third of the month, is checked say on the twentieth of the month when all of these things have been done.

	Month	To Date
Sales	\$1,000,000	\$7,000,000
Per cent Variable Cost....	.115	.115
Variable Cost	\$115,000	\$805,000
Fixed Cost	8,333	66,664
Total Cost	\$123,333	\$871,664

The "To Date" can be computed by adding the standard for the various months or by taking 11.5 per cent of the sales to date and adding eight times the monthly fixed cost, as is done in the example given.

The "Variation to Date" is the difference between the actual and the standard cost.

Actual Cost	\$910,664
Standard Cost	871,664
Variation	\$39,000

You will notice that the "Variation to Date" is given under two headings, "Good" and "Bad" (meaning good results or bad results), both with respect to amount and with respect to its effect upon the per cent of Variable Cost. The way the per cent of Variable Cost is determined is by dividing the sales to date into the amount of the variation to date.

$$\frac{\$7,000,000 \times \$39,000}{.0056}$$

The conventional departmental or unit operating statement shows the month's costs as compared with the preceding month and the same month last year; thus:

August \$129,333. Previous month \$76,833. August last year \$117,256.

August \$129,333. One twelfth last year \$131,256.

The difficulty with all such conventional reports is:

1. The conventional statement lacks a standard based upon the particular conditions of the month in question. In Exhibit J the standard is modified to meet the actual conditions of the month in question.

2. The conventional statement has no definite bearing upon profit and loss. Exhibit J shows definitely the effect upon profit or loss; in other words, August results increase the loss by \$39,000, or one-half of one per cent on the entire volume of sales.

3. Each conventional statement is independent of every other statement; they have no collective significance. Exhibit J is one of a series of statements, all of which when listed and added together constitute a statement for the business as a whole.

4. Even should we grant for the sake of argument that the previous month, the same month last year, or one-twelfth of the total for the last year of a conven-

tional statement constitute a standard, there is no subdivision of the item of which the standard is composed. The details for all statements like Exhibit J are shown on a corresponding sheet like Exhibit G.

The question has been raised whether the present Variable Cost ascertained in accordance with the formula here presented is really constant, as is assumed to be the case in setting standards for different volumes of business on the basis of Fixed Cost and Variable Cost previously determined.

The answer is that it is not if we mean to the last dollar and cent, but for practical purposes it is.

Take for example Exhibit G and let us run down the items:

Jobbers discount is obviously constant in that it is itself a per cent of sales. The same is true with reference to bad debts, rebates and allowances. While the actual will vary, the standard is constant.

The managers and territorial supervisors as part of the fixed expense will not vary, but the other salary items will vary according to the sales from the minimum to the maximum figures shown, and these variations will not be in direct proportion to the increase or decrease in sales. Assume, for example, that sales increase and we find it necessary to put on an additional stenographer and bookkeeper. The additional stenographer and bookkeeper will probably suffice for an additional \$100,000 of sales, and therefore the cost expressed in terms of per cent of sales will be a little higher when we first put them on than it will be at the end of the period when the sales have so increased that we have to put on still other additional clerks. This is true of a number of the items.

On the other hand, in practical experience you will find that the various items seldom shift at the same point; so that, taking any organization unit of considerable size, you will find that the Variable Cost arrived at in the manner here described stays virtually at a constant per cent of the fluctuating sales, provided, of course, that the manager of the department is on the job and keeps his expenses at a minimum, a thing which the use of standards of this kind stimulates him to do.

The very making of standards in this way forces a manager to think through his problem and to see his expenses in terms of results.

Let us assume, however, that after making the standard he finds it impossible to keep within it. This simply forces him to go to the chief executive, explain wherein the standard is wrong, and have a new standard made. This he will do the moment that he sees his costs are

exceeding his standard, because he does not want to wait until the chief executive receives his statement and sends for him. This is another advantage of working against standards made in this way.

The opportunity for attributing differences between two periods to the differences in the periods is done away with. The chief executive is assured that his costs will be maintained substantially at the standard or he will be informed of the fact while he is still on his way "to Tarrytown," as it were, and he still has an opportunity to speed up and make up the lost time. Without this business speedometer he would have to wait until his hour was up, and then it would be too late.

If I have made clear the use of the standard and the monthly report by the department heads, we can now go on to the statement which the chief executive himself receives. This statement, as already explained, is merely a tabulation including the last line of each of the monthly statements of the separate organization units.

Exhibit K—Conventional Operating Report

Before showing the final statement under these methods, I am going to show you, for purposes of comparison, the conventional Operating Statement. There are many modifications of this statement but I think this one is typical of the large majority of the best.

With this statement, how is the chief executive to know whether or not the results are satisfactory in proportion to the conditions under which the business was done, or how to appraise the accomplishments of the separate organization units?

Assuming that he does not consider the results satisfactory, and he secures from the bookkeeper an additional statement giving further details, how is he to appraise the expenditures for one item as against those of another? About the most that he can do is what is usually done, namely, to compare the results of the month in question with the preceding month and with the same period for the preceding year, and even then he only knows how one compares with the other. He does not know how either compared with a reasonable expectation. If the conditions between the two periods compared are different, if prices have gone up or down, if the firm has done more or less business, or if materials cost more or less, how is he to reconcile these differences?

His expenditures are arbitrarily divided among a variety of responsibilities, and even if he determine that his production, sales, delivery or some other item

TYPICAL OPERATING REPORT (Expressed in Thousands)				
OPERATING STATEMENT August 31st, 1921	Current Month		To Date	
	1921	1920	1921	1920
GROSS SALES	2,500	3,000	16,000	18,000
Discounts and Allowances	230	250	1,600	1,800
NET SALES	2,270	2,750	14,400	16,200
Cost of Goods Sold	1,600	1,850	10,000	10,700
GROSS PROFIT	670	900	4,400	5,500
Administration and Selling	520	550	3,500	3,700
OPERATING PROFIT	150	350	9,000	1,800
Depreciation and Fixed Charges	40	40	285	285
NET PROFIT	110	310	615	1,615
NOTE: This example is intended to indicate the character and form of the usual operating statement rather than the degree of detail in which it may be made.				

Exhibit K

of cost is high, how is he to fix the responsibility for the high cost without endless analysis which is impracticable as a current procedure?

There is an interesting fact in connection with industry, and especially the job of the chief executive, which is not generally recognized or understood; it is that *most of the undesirable results come from lack of knowledge as to where the trouble lies rather than in the difficulty of removing it, once the source is definitely located.*

Exhibit L—Recommended Operating Report

You will notice that the last column on this exhibit is exactly the same as the last column on Exhibit H; in other words, it is the *standard* per cent Variable Cost to sales for each of the different organization units or groups of responsibilities.

The column immediately preceding it is the *actual* per cent of Variable Cost of sales.

The difference between the footings of these two columns shows at a glance the total difference between actual cost and what it should have been. In this case the actual Variable Cost has been \$.0114 of each dollar of sales in excess of the standard. Multiplying this by the volume of business done—\$16,000,000—we see that the variation from standard in terms of dollars and

cents is \$181,000 to the bad. (Difference between footing of third and fourth columns from right).

Please especially note that this statement is literally made up of the last lines of the statements of the individual organization units, brought together. There is no reason for an uncertainty on the part of the chief executive as to where to turn his attention for the cure of the condition that he finds. All he has to do is to let his eye run up the column "Bad" for variation and he will see exactly which responsibilities have fallen below the standard. Having determined this, he knows exactly for whom to send, and when he comes before him all he has to do is to refer back to the budget for that responsibility—that is, the sheet corresponding to Exhibit G—to see in just exactly what item the excess expense was incurred.

If actual expenditures are subdivided under the three headings suggested in Exhibit G—payroll, physical things and outside service—so that they are comparable with the standard, it will not be difficult to find out whether the increased expense is justifiable or not.

It may be justifiable for the current period but may not be justifiable in the future, in which case the standard would not be changed. The chief executive would simply say to the manager that the additional expense was justifiable in this case but should not recur in the future.

If it was not justifiable, he would point out to the manager wherein he had been remiss.

If, on the other hand, it was not only justifiable but would probably recur in the future—if, in other words, there was a mistake in the standard—he would make the necessary change in the standard.

The question has been raised whether a statement made up in this way will check with the financial books. Let us see just what we have done. First, we have divided our expenditures according to the organization unit authorizing them. Secondly, we have left every penny of expenditure where it was first charged. There has been absolutely no diverting of expense from one account to another. Therefore, instead of complicating things, *we have simplified them*. All that we have to do is to add up the gross revenue, add up the expenses, deduct one from the other, and the difference is necessarily our profit or loss. (See foot of first column).

What I have shown you may at first impress you as involving a great deal of detail work. This impression can be only if you are not familiar with the vast detail work involved in making up statements as they are usually made. It is safe to say that there is less paper

work involved in the procedure which I have outlined than in any other procedure which makes even a pretense of giving accurate monthly figures.

It is impossible in one evening's talk to answer all the different questions that will occur according to the character of the industry in which you happen to be experienced. For simplicity, I am sticking close to the one particular enterprise previously described. I think, however, I should explain what we must do if the amount of goods produced and those sold do not happen to be the same.

If production has been say \$100,000 list price in excess of sales, we should add the excess production at inventory cost to the profit as shown:

Profit as shown on Operating Statement.....	\$616,000
Value of goods produced in excess of those sold	
\$100,000 × .55.....	55,000
	\$671,000

If sales had been say \$100,000 list price in excess of production, we should deduct from the profit as shown the value of the goods sold in excess of those produced, at inventory cost:

Profit as shown on Operating Statement.....	\$616,000
Value of goods sold in excess of those produced	
\$100,000 × .55.....	55,000
	\$561,000

Having shown the Operating Report compiled with a view to showing the operating effectiveness of the organization and the placing of responsibility for good and bad results, I shall now recapitulate these same figures, compiling them with a view to furnishing information with reference to matters of policy; whether a change in price might be advantageous to the company, and the relative merits of groups of commodities, territories, methods of selling, advertising appropriations and the like.

Exhibit M—Commodity Report

This exhibit gives you the following information under two separate commodity classifications. There may be one or a dozen commodity classifications as circumstances may make desirable.

Inventory Cost	Net cost of commodities available for distribution.
Basic Sales Cost.....	Inventory cost plus the cost of general sales organization.
Branch Sales Cost.....	Total cost of commodities sold through company's own branches.
Jobbers Sales Cost.....	Total cost of commodities sold through jobbers.
Export Sales Cost.....	Total cost of commodities sold for export.

OPERATING REPORT - 7 Months to August 31st, 1921 (Expressed in thousands)										
ELEMENTS	Sales At List	Cost		Variation		Percent Variable Cost August	Commodity A		Commodity B	
		Actual	Standard	Good	Bad		Standard	Actual	Standard	Actual
Pres. & Gen. Mgr.										
Com. A. Cor.										
Com. B. Cor.										
Development										
Personnel										
Int. Relations										
Purchasing										
Finance										
Accounting										
Credits										
MANAGEMENT	16,000	2,447	2,467	20		.0487				
Production										
Shops										
Routing										
Cost										
Stores										
Maintenance										
Production Overhd.	16,000	2,517	2,467	50		.0831				
Materials	16,000	3,950	4,000	50		.2469				
Direct Labor	16,000	3,300	3,200	100		.2062				
PRODUCTION	16,000	9,767	9,667	150		.5062				
Distribution										
Sales Infor.										
Advertising										
Merchandise										
DETRDTH. OV. ED.	16,000	615	597	18		.0300				
Com. A Sales	9,250	21	16	5		.0015				
Com. A Bran.	2,000	428	420	8		.1440				
Com. A Jobb.	7,000	911	872	39		.1206				
Com. A Exp.	250	50	51	1		.1420				
Com. B Sales	6,750	19	13	6		.0019				
Com. B Bran.	5,000	877	827	50		.1200				
Com. B Jobb.	1,000	148	168	20		.1350				
Com. B Exp.	750	103	102	1		.1119				
DISTRIBUTION	16,000	3,170	3,055	21		.1545				
SALES	16,000	15,364	15,200	91		.7114				
COST	15,364			271						
PROFIT	\$616									
Equal to increase in Net Assets as shown on ASSETS AND LIABILITY STATEMENT.										

Exhibit L

Exhibit M

OPERATING SUMMARY EXPRESSED IN PER CENT OF SALES AT LIST					
7 Months to August 31st, 1921.					
ELEMENTS	Commodity A		Commodity B		Actual
	Standard	Actual	Standard	Actual	
Management	.0600	.0487	.0600	.0487	.0487
Production Overhead	.0600	.0631	.0600	.0631	.0631
Materials	.2500	.2449	.2500	.2449	.2449
Direct Labor	.2000	.2042	.2000	.2042	.2042
INVENTORY COSTS	.5800	.5849	.5800	.5849	.5849
Distribution Overhead	.0290	.0300	.0290	.0300	.0300
Commodity Sales Supervision	.0010	.0015	.0010	.0015	.0019
BASIC SALES COST	.5800	.5864	.5800	.5864	.5864
Branch Sales Supervision	.1400	.1440	.1400	.1440	.1200
BRANCH SALES COST	.7200	.7304	.6900	.7048	.7048
Basic Sales Cost	.5800	.5864	.5800	.5864	.5864
Jobbers Sales Supervision	.1150	.1206	.1150	.1206	.1350
JOBBERS SALES COST	.6950	.7070	.7350	.7218	.7218
Basic Sales Cost	.5800	.5864	.5800	.5864	.5864
Export Sales Supervision	.1450	.1480	.1107	.1117	.1117
EXPORT SALES COST	.7280	.7284	.6907	.6985	.6985

M

You will remember in connection with Exhibits E and F that sales values are based on list price rather than on net sales price. The discounts under different methods of distribution are treated as expense in making up the organization unit budgets as per Exhibit G, and in making up operating statements as per Exhibit J. This is to assure that the per cent of cost to sales price under different methods of selling will be comparable. If we used net sales prices and should give only 10 per cent to our own branches because we have to carry the branch cost, and 15 per cent to jobbers because they carry their own branch cost, you will see that the net results would be misleading. Under the method used the figures shown in this exhibit for cost of goods sold under different conditions are comparable, and it is possible to see at a glance the relative merits of the different methods of distribution.

All of the figures on this statement are with reference to Variable Cost, but because we know the Fixed Cost for each item and that the total Fixed Cost is \$6,000,000 a year, we are able to figure the effect upon profit and loss which any change in policy would make.

For the sake of clearness I shall work out the effect on profit if we should reduce the price on Commodity B five per cent with the expectation of increasing the business an additional \$2,000,000.

The present Variable Cost of Commodity B, we shall say for easy figuring, is 70 per cent of sales. This leaves a Contribution to Fixed Cost and Profit of \$.30. If we reduce the price 5 per cent this would be \$.05 on each dollar of sales, which would leave us \$.25:

		Prospective Sales.	\$8,750,000
Present Sales.....	\$6,750,000	Prospective Contribution	.25
Present Contribution	.30		\$2,187,500
	\$2,025,000		2,025,000
Advantage of 5 per cent reduction in price provided it results in an increase of sales of \$2,000,000...			
			\$162,500

I have already said that few individual commodity prices are based on a uniform margin of profit. Most successful businesses are based on prices for different commodities which produce very different profits, yet which produce the greatest aggregate profit for the business as a whole.

Certain articles are sometimes sold at cost—or even at a loss—as a leader, to meet certain competition, to keep the plant going or for other reasons. Therefore, in order to work out the combination of prices to produce the greatest aggregate profit, we must know the cost of each individual commodity.

In Exhibits L and M we have used average figures. Therefore, to get figures for any one commodity, we must find the difference between the individual commodity and the average, and add or deduct this amount to or from the average.

Take, for example, Commodity A 1 A sold to jobbers. From Exhibit F we find the material and labor cost is \$.5472, but also from Exhibit F we find the average is \$.4500. The difference is \$.0972, which must be added to the average total cost of Commodity A sold to jobbers as shown on Exhibit M of \$.7070. This means the Variable Cost of Commodity A 1 A is \$.8042 as compared with an average of \$.7070 for all Commodity A items sold to jobbers. The Contribution to Fixed Cost and Profit is then \$.1958 as compared with the average of \$.2930.

Again let us see what the Contribution to Fixed Cost and Profit will be if we reduce the price five per cent. Since the figures are already on a per cent basis, it would reduce the contribution as many cents per one dollar of sales as is taken off of the price in percentage. The contribution would then be \$.2430.

Again let us see what the result would be if the cost of material and labor were increased say 10 per cent. Material and labor are 45 per cent of the total Variable Cost, so 10 per cent added to them would be equal to \$.045 on each dollar of sales. The contribution would then be \$.2480.

Or if all of the foregoing possibilities were taken into consideration in connection with the same item, namely, Commodity A 1 A, the result would be as follows: Starting with an average contribution of \$.2930 we should deduct \$.0972 to bring it to the cost of the individual item. This would leave us \$.1958. We should then deduct \$.05 representing 5 per cent reduction in price, bringing it to \$.1458, and then \$.045 representing a 10 per cent increase in cost of material and labor, bringing it to \$.1008.

It is not likely that all of these things will happen at one time to any one item, yet such things have happened within the past year. I have made these figures merely to show you the flexibility of figures when expressed in terms of Fixed Cost and Variable Cost.

6. FINANCIAL FORECASTS

Finance is too usually regarded as separate and apart from operating. Many concerns have gotten into trouble, especially in the last year or so, through too complete separation of these two major functions. Actual records show that many of the difficulties of

FORECAST OF PROFIT AND LOSS, BANK BALANCE AND CREDIT POSITION (Expressed in thousands)																
RESPONSIBILITIES AND LEDGER ACCOUNTS	DEC 31		JAN		FEB		MCH		APR		MAY		JUN		JULY 1	
ASSETS	A	G	A	G	A	G	A	G	A	G	A	G	A	G	A	G
MANAGEMENT																
Bank Balance	500	500	500	500	200	200	743	743	300	300	161	161	95	95	1594	
Notes Receivable Due Feb'y	200	200	200	200	300	300	300	300	600	600	600	600	600	600		
" " " Apr	300	300	300	300	600	600	600	600	1200	1200	1800	1800	1800	1800	500	
" " " June	600	600	600	600	2400	2400	1200	1200	3000	3000	2500	2500	2500	2500	1800	
Accounts Receivable Dec 31	5400	5400	2000	2000	2000	2000	2000	2000	2000	2000	3000	3000	2500	2500	2500	
" " " January											400	400	600	600		
" " " Feb'y											1800	1800	1800	1800		
" " " March											2500	2500	2500	2500		
" " " April											3000	3000	2500	2500		
" " " May																
" " " June																
Income from Outside Investments		200		200		200		10		200		20		10		16000
Discount on Purchases		10		10		15000				20		16000				
Fixed Capital	15000	15000					15000									
PRODUCTION																
Materials and Work in Process	4000	3900		3900		3900		3700		3600		3500		3400		2400
Finished Products	5000	5300		5300		5600		5300		5300		5000		5000		5000
Total Assets and Collections	31000	33410	3710	3710	31910	2810	32953	2953	33120	2920	32981	2781	32706	3506	30794	
Total Liabilities and Payments	31000	33060		31990		3067	32073		31770	2759	31261	2686	30725	1911	28814	
Net Profit and Bank Balance		360			520	743	880		1350	161	1720	95	1980	1594	1980	
LIABILITIES																
MANAGEMENT 20.8 + 5%																
Bank Deficiency	1000	1000		1000		31		1000		198						
Notes Payable Due Jan'y 10	1000	1000		1000		200		2000		5000						
" " " Feb'y 5	800	800		800				500		1000						
Accounts Payable Dec. 31	20000	20000		20000				20000		5000						
Increases to Fixed Capital	7145	7145		7145				20000		20000						
Capitalisation	150	200		150				180		200						
Surplus	150	15		15				30		45						
Fixed Charges	50	295		243				293		318						
Interest								243		268						
Operating																
PRODUCTION 20.8 + 50%	625	1150		625		525		525		525						
Materials		500		500		500		500		500						
Labor		100		200		200		300		400						
Depreciation	80	313		233		233		233		233						
Operating																
DISTRIBUTION 84 + 15%																
Discounts	125	174		40		200		300		250						
Reserves	25	160		135		135		160		160						
Operating																
Total Liabilities and Payments	31000	33060	3741	3710	31990	2867	32073	3151	31770	2759	31261	2686	30725	1911	28814	
Total Assets and Collections								2953								
Net Loss and Bank Deficiency								198								

Exhibit N

both large and small concerns alike result from operations on a scale beyond their financial resources. Whoever may have the direct responsibility for the broader phases of finance, the separate functions of finance should be delegated to certain organization units just as specifically as the separate functions of operating, and the effectiveness of one group should be followed as closely as the other.

Under ordinary methods of accounting, it is difficult to forecast the financial effects of operations, but with operating standards such as are contained in Exhibit H, the financial results on any given basis of operation are comparatively easy to determine. We can forecast not only the profits and losses reasonably to be expected, but also the bank balance and credit position of the company at the close of each month for some months ahead.

Exhibit N—Forecast of Profit and Loss, Bank Balance and Credit Position

In this exhibit we have a forecast of the financial effects of operations on the basis of the maximum sales given in Exhibit H. To make this statement we need only to know, in addition to the information contained in Exhibit H, the subdivision of sales by months, which will already have been made in connection with the sales quota, and the experience of the company in the matter of collection of accounts receivable.

The first column represents the major subdivisions of responsibilities and duties used throughout all of the statements—Management, Production and Distribution. Under each of these are listed the items through which these major responsibilities affect the financial statement.

The second column represents the status of the company as of December 31, and the double columns to the right of this represent a forecast of the status for each of the various months from January to and including June. Under each month the first column indicates "Assets" or "Liabilities," and the second column "Collections" or "Payments." The last column represents a forecast of the status as of July 1. This statement may be projected as far into the future as desired.

Dealing with the assets, the first item under Management is Bank Balance. This is shown as an asset on December 31, and as both an asset and collection in each succeeding month. In making a forecast on a prescribed basis it often happens, as in this case, that instead of a bank balance, there is a bank deficiency. A deficiency is shown under Liabilities.

The second item is Notes Receivable. They are shown as an asset on December 31, and in each month up to the date of payment when they appear also as a collection and thereafter disappear.

The third item is Accounts Receivable. They are shown as an asset on December 31, and in lesser amount in each succeeding month according to probable collections, computed on the basis of experience. The amount collected in each month is entered as a collection, and the balance carried forward as an asset to the succeeding month.

The expected sales and collections for each month are entered as accounts receivable and dealt with in the same way, each on a separate line.

The fourth item is Income from Outside Investments. These appear both as an asset and a collection in the month in which they are received.

The fifth item is Discount on Purchases. These also appear both as an asset and a collection in the month in which the discount is charged.

The sixth item is Fixed Capital. This appears in a lump sum as an asset under December 31, and also in increased or decreased amount as it may be added to or taken from in each month thereafter.

The first item under production, is Materials and Work in Process. This appears as an asset on December 31, and in each succeeding month in increased or decreased amount according to the difference between the material and labor put into work and that represented by the work completed. In this exhibit we have assumed that the inventory will be reduced \$100,000 in each month.

The second item is Finished Products. These are shown as an asset on December 31, and in each succeeding month in increased or decreased amount according to the difference between production and sales. In this case production is assumed to be maintained on a uniform basis sufficient to take care of \$2,500,000 of sales at list in each month, whereas the sales are assumed to vary as indicated under Accounts Receivable. The variation in Finished Products is, therefore, 55 per cent¹ (being the Inventory Cost as shown on Exhibit M) of the difference between \$2,500,000 and the sales.

Dealing with Liabilities, the first item under Management is Bank Deficiency. This has already been explained under Assets.

Notes and Accounts Payable are dealt with in the same way as Notes and Accounts Receivable.

¹ In Exhibit N it happens to be computed at 60 per cent instead of 55 per cent as in Exhibit M.

Increases to Fixed Capital are shown as a liability in the months in which they will be incurred, and corresponding amounts are added to Fixed Capital as an asset. They are entered as a payment in accordance with the terms of payment for the assets acquired.

Capitalization, representing the entire funded obligations of the company, is shown in one lump sum as a liability on December 31 and in each month thereafter.

Surplus is shown in the same way.

Fixed Charges are shown as a liability to the extent of \$50,000 in each month. They are shown as a payment in January and April. The January payment represents a dividend from funds available December 31. A like amount is shown as having been accumulated for payment in July.

Interest is shown as a liability to the extent of \$15,000 in each month. It is shown as a payment in such amount and such months as may be needed.

Operations is an item representing the current expenses of operating the group of organization units coming under the general head of Management. The amount is shown under Liabilities in each month and also under Payment as circumstances may require.

Under Production, Materials are figured as a liability at 25 per cent of the monthly production quota of \$2,500,000 at list. As Materials and Work in Process as an asset are reduced \$100,000 in each month, this amount is also deducted from \$625,000 which otherwise would have been used. Payment for these materials is figured as being made in each succeeding month.

Labor is figured as a liability at 20 per cent of the sales quota. Payment is figured as being made in the same month.

Depreciation is figured as a liability at \$100,000 in each month and is allowed to accumulate throughout the period.

Operations is an item representing the current expenses of operating the group of organization units coming under the general head of Production. The amount is shown under Liabilities in each month and also under Payment as circumstances may require.

Under Distribution, Discounts are figured as a liability and as a payment at 10 per cent of the sales in each month.

Reserves are figured as a liability at a fixed per centage of sales in each month. Payment is figured as being made in varying amounts from month to month as commissions and one thing and another for which the reserve is made become payable.

Operations is an item representing the current ex-

penses of operating the group of organization units coming under the general head of Distribution. The amount is shown under Liabilities in each month and also under Payment as circumstances may require.

The Assets and Collections and the Liabilities and Payments are then added and the one deducted from the other, showing, as the case may be, Net Profits and Bank Balance under Assets, or Net Loss and Bank Deficiency under Liabilities.

I have purposely made this hypothetical forecast of such a nature that it shows bank deficiencies in certain of the months, so that you may get a sense of how unfavorable features of any proposed basis of operation will be shown up by making a statement of this character. With this statement before you, it is evident that you must either arrange for further loans at the bank or for making more prompt collections. In practice, a shortage of cash in January would have shown up in a similar statement made prior to December 31, and provisions for meeting this condition would previously have been made.

I do not know whether I have made it clear just where I got all of the figures used in this statement. The amounts in the column December 31, are assumed to have been taken from a statement as of that date. The amounts put down under Assets for each of the months are a projection of the figures of December 31 with the addition of the expected sales, income from outside investments, and interest on purchases within the month. The amount put down under Collections is the amount expected to be collected from each of the various items within each month.

Under Liabilities the amounts put down in each month are a projection of the December 31 figures with the addition of the costs for each month's operation based on the standards shown in Exhibit H. You will notice I have filled in Fixed and Variable Cost as shown on Exhibit H after each of the three major subdivisions of responsibility—Management, Production and Distribution.

Thus the items affecting assets and liabilities, bank balance and credit position may be projected over any period on different bases of operations, and the best results under the circumstances determined. Such statements should be made monthly. Their simplicity makes that possible.

It is impossible in one evening to show how one may apply these methods to his own enterprise, but I have tried to make clear their flexibility and applicability to any particular case.

MEASURING WASTE IN INDUSTRY¹AN EXAMINATION OF THE METHOD EMPLOYED BY THE
COMMITTEE ON ELIMINATION OF WASTE IN INDUSTRYBy C. E. KNOEPPEL²

A TRAVELER riding in a comfortable berth in a modern Pullman car over any of our leading railroads, has little if any conception of the problems and obstacles encountered by those who were behind the original development.

In the case of the report "Waste in Industry" prepared by the Committee on the Elimination of Waste in Industry, there is likely to be the same lack of conception on the part of the reader, of the problems and the obstacles encountered by those responsible for the investigation. The report and its conclusions—we are not to discuss the latter tonight—are the tangible results of a definite work on the part of a group of serious and able men.

Behind anything tangible and definite is always that something which we call vision or imagination or plan or program—that intangible and indefinite thing which makes possible an appraisable result. It is this something which we are here to discuss, and which we should discuss to the fullest, in order not only better to appreciate the finished product as it affects the future of American industry, but in order to interpret for others the whys and wherefores of the work behind the report, that a better mechanism for appraising indus-

try may be developed. Let me therefore hastily sketch for you the background of the work done, that you may have a mental picture of the reasoning behind the development, which of its kind is the first to be presented to American industry by a group of engineers.

We had a paradox on our hands to begin with. Mr. Hoover, on the one hand, asked for an assay of waste in industry, in a few short months, a task to which a lifetime could be devoted, and which some felt should have as many years. Mr. Hoover was the leader and had the vision, and a few short months it had to be. Mr. Wallace, on the other hand, aided and abetted by Mr. Alford, looked through the dictionary for the one word which should guide our activities and finally under the letter "Q" located a most excellent one—"quantitative"—and I can assure you we were not allowed to forget the word or its meaning, from the time we started until we finished. To the best of our several abilities we gave Mr. Wallace his way.

In the early deliberations of those of us constituting the smaller or preliminary committee, Messrs. Channing, Linton, Wolf and the speaker, assisted by Messrs. Williams, Alford, Wallace and Hunt, we realized that we had another problem facing us, which was that unless we had behind our work plan and program, unity in expression, similarity in calculation and comparability in results, there would be as many different reports as there were different individuals making them. If you will mentally visualize the personnel of the committee, you will better appreciate how necessary it was to have uniformity and coordination constantly in our minds. I do not believe there was ever a Committee of eighteen men any stronger and abler than our committee, but this strength constituted our chief weakness, owing to the different schools of thought represented, the individual strength of each man, and the different experiences and pronounced ideas of each.

¹ A paper presented at a meeting of the Taylor Society, New York, Dec. 1, 1921.

In 1921 the Federated American Engineering Societies appointed a Committee on Elimination of Waste in Industry to investigate and report on waste in American industry. The circumstances of the undertaking of this investigation required that it be completed in six months. The report was published by the McGraw-Hill Book Co.—"Waste in Industry." The paper and discussion here printed were not concerned with the findings of the Committee, but with the methods of investigation.

The Committee consisted of Herbert Hoover, President F. A. E. S.; J. Parke Channing, Chairman; L. W. Wallace, Vice-chairman; and L. P. Alford, George D. Babcock, William R. Basset, F. G. Coburn, Morris L. Cooke, Harrington Emerson, Ira M. Hollis, Edward Eyre Hunt, C. E. Knoepfel, Robert Linton, Fred J. Miller, H. V. R. Scheel, Sanford E. Thompson, John H. Williams and Robert B. Wolf.

² C. E. Knoepfel & Co., Inc., New York.

Another factor entered into our problem. Being a pioneer work of the most important kind, in an age of conflicting interests, regarding a subject about which little was known, we appreciated fully that no matter what kind of a report was made, it would come in for criticism on general principles, and that this criticism would vary in direct proportion to our failure to take every step possible to transfer the activities of the Committee from the realm of *opinion* to the world of *fact*.

We also realized that we were setting out to appraise that most intangible thing on earth—human reactions. We were not going to assay a mine out-cropping, or a railroad location, or analyze a new form of gas. We were to assay a thing having few if any constants, in a realm characterized by “if,” “but,” “whereas” and “unless.”

The most serious problem which confronted us is well expressed on page 4 of the report:

It is a fact that no accepted management and labor terminology exists and, further, few units of weighing or measuring the performance of industry or of any plant or department or section thereof have been developed by engineers in a way to be standardized, or to yield results or conclusions on a comparable basis.

These problems, the last one particularly, forced us to consider the development of a *medium of expression*, and the creation of a *yard stick* to measure with.

To the everlasting credit of American engineering, let it be said that the finished product of the eighteen men who served on the Committee, will stand for all time as an outstanding monument to the vision, ability and courage of the members, when once the problems enumerated are fully appreciated. This is not a defense, as no defense of the great work done is needed, but my own personal and honest tribute to the other seventeen men who gave so freely of their time and energy.

At the start, the obstacles in the way seemed insurmountable, for with different plants, in different industries, having different conditions, to be studied by different men, from different angles, some of us felt that we saw our finish before we had even started, and there were times when my heels were frost-bitten if my toes were not.

So far as the principle underlying the development of the questionnaire and evaluation sheet was concerned, a work which was delegated to John H. Williams and the speaker, it was felt that if the medical specialist could take that most complex thing on earth—the human body—and after an examination, diagnose and prescribe, we could well follow the same fun-

damental plan of assay. Further, if the medical specialist could use a watch to time pulse beats, a gauge for blood pressure, a thermometer for temperature, an X-Ray for observation and chemistry for analytical work, and thereby evaluate, we could develop some means for evaluating our findings. Finally, if the medical specialist, instead of spending days and weeks in thoroughly examining the human body, could by confining his attention to certain definite things, make his examination and diagnosis in a comparatively short time, through proper questioning and observations and tests, we could probably do likewise.

If in surveying a plant we should find that the workmen ground their own tools to conform to their own ideas as to angles, and that they looked after the speeds and feeds of their machines, we could conclude that there was a lack of standardization, with consequent loss in production. This is an important and definite element; a leading question could be prepared to cover it, and the condition could be assayed as the worst possible.

So, falling back on science, there were evolved such principles behind the questionnaire and evaluation sheet as:

1. Analyzing to determine those factors in industry wherein waste might be expected to be discovered.
2. Developing questions, the answers to which would serve as the basis for securing information, as to the relative amount of consideration given to each point covered by the questions.
3. Judging as to the relative degree of lack of effectiveness in those factors examined, and evaluating according to the nature of the information secured.

In developing the questionnaire and evaluation sheet around these principles, the following fundamentals were our guide:

1. Waste and not effectiveness was to be assayed, much as one would study a refuse pile to develop a by-product.
2. A given practice is not wasteful until a better practice has been developed, therefore theoretical standards of excellence should be ignored.
3. Waste is the difference between possible attainment and actual performance, between the average practice and the best known practice.
4. No result is one hundred per cent wasteful.
5. Best known practice would be zero per cent of waste.
6. Responsibility for the cause was as important to appraise as the cause itself.

With principles and fundamentals to guide us, and keeping uniformity and coordination in mind, the task of developing questions and the background was then undertaken, in which work we were fortunate in securing the services of Mr. C. L. Barnum, who rendered valuable assistance, especially on the evaluation sheet development, and whose work should receive especial commendation.

Causes of waste were divided into three main groups:

1. *Organization*, dealing with the human factor.
2. *Technical knowledge*, dealing with physical factors.
3. *Utilization*, dealing with the use of 1 and 2, or performance, or administration in the generally accepted sense.

Naturally it was desired to determine relative responsibility for the causes of waste, so as to deal, as engineers should, in terms of cause and effect, and the following was finally decided upon:

1. Responsibility assayed against *Management*.
2. Responsibility assayed against *Labor*.
3. Responsibility assayed against *Outside Contacts* (the public, trade relationships and other factors).

Questions developed were grouped under key or "leading" questions,¹ in this way enabling an investigator to work by exceptions. We would not stop to examine a man's lungs, if his heart had stopped beating; nor would we ask detail question U 3(d)—"Give amount and percentage of idle time by months for years 1918-1919-1920 commenting on causes of peaks and depressions," if leading question U 3—"Is there any record of idle machine time?" should be answered in the negative. In other words, each key question had a special significance. Negative answers would mean one thing; affirmative answers with supporting data would mean just the opposite condition. Any variation in between these two extremes could therefore be properly weighed, at least in a relative manner. From this it was assumed that one could say whether a thing was "bad" or "excellent" as extremes, and that in between, could appraise a condition as poor, fair and good. As no result is one hundred per cent wasteful, it was decided to use this scale:

Excellent	0% of waste
Good	20% " "
Fair	40% " "
Poor	60% " "
Bad	80% " "

The premise therefore was that if all questions could

be properly classified under key questions, these in turn being grouped under three main causes of waste, points of *possible* waste could be assigned to each cause, the three to total 100 points *possible* waste. Now by multiplying each by the factor representing the estimate, as excellent, good, bad, fair or poor, the *actual* points of waste could be determined. For example, if we arbitrarily assigned 33.3 points against *Organization*, *Technical Knowledge and Utilization*, or 100 points in all, and called the conditions fair or 40% waste as to *Organization*, good or 20% waste as to *Technical Knowledge*, and poor or 60% of waste as to *Utilization*, the calculation would be:

<i>Organization</i>	33.3 × 40% = 13.3 points waste
<i>Technical Knowledge</i>	33.3 × 20% = 6.7 " "
<i>Utilization</i>	33.3 × 60% = 20.0 " "
Total	40.0 " "

Having gone thus far, we could then take each cause and assay the degree of responsibility as between management, labor and outside contacts, by dividing the 33.3 points according to knowledge of the industry, labor relations, trade conditions, local factors and the like, as for instance 11.1 points each.

Having sketched the broad outlines, you can see wherein a breakdown as to assigned points could be made within each group, placing opposite each the estimated factor of waste, multiplying to determine the points of waste.

It was felt that the relative weights decided upon for the three groups should be identical for all plants in the same industry in order to have the results comparable; while the responsibilities of management, labor and outside contacts could vary for different plants *within* an industry, depending upon size, type, conditions and location.

To indicate the variations in the total assigned points in the findings of the committee, let me list the following:

Industry	Organization	Technical	Utilization
Building Trades	55	10	35
Men's Clothing	35.7	28.4	35.9
Boot and Shoe	42.5	10.5	47
Printing	35	35	30
Metal Trades	20 to 35	15 to 35	37 to 55
Textile	25	45	30

I mention these variations because of the criticism which might be advanced of the arbitrary nature of the assignment of values. There may be a feeling that the assignments should have been definite, as for instance one-third each for *Organization*, *Technical* and *Utilization*, on the premise that each was as important as the

¹ See pp. 34-50 of the Report.

others, and that like a three-legged stool, no leg could be shortened or extended in length without tilting the stool or tipping it over entirely. Another viewpoint was that fifty of the one hundred points should be considered as the utilization value, on the theory that the greatest of the three factors is the way organization and technical knowledge are manipulated to useful purposes by those responsible for the administration of a business.

The language of the instructions accompanying the evaluation sheet—"determine according to judgment and impressions from investigation"—may be criticised on the score that if we enter the realm of reason and mental debate, we leave that of fact and definiteness. I am not so sure that this is so. Obviously, you would not go to a horse doctor for a medical examination, or to a contractor to remove a tooth, just because he does excavating. Likewise, you would not trust an industrial survey to a lawyer or a preacher. A competent engineer with a knowledge of the industry and plant being studied should, however, be able to say whether a given thing was "bad" or "excellent," as the two extremes. If he could not call it "bad" or "excellent," he could say whether it approached or approximated one or the other of these extremes, or "poor" or "good." If one of these should not satisfy him he could use a compromise or mean as the value, calling it "fair."

I am perfectly willing to admit that there are difficulties in the way of breaking down the total assigned points, Column 13, opposite each of the three causes, and apportioning them to management, labor and outside contacts. If a genius like Carl Barth, however, can take a dozen variables and reduce them to a slide rule, there is some justification for the belief, that competent engineers, like the ones who conducted the six assays for the Hoover Committee, can say whether responsibility classifies under one or more of the three divisions. If they know the industry, the nature of its problems, and the real meaning of the key questions, they can indicate, as to points at least, the division which seems proper.

On page 9 of the Report there is this statement: Over 50% of the responsibility for these wastes can be placed at the door of management and less than 25% at the door of labor; while the amount chargeable to outside contacts is least of all.

Whatever else may be said of the questionnaire and evaluation sheet, the fact remains that a quantitative conclusion, satisfactory to the engineering mind, was the definite result of the assays made, and in itself amply justifies the use of the mechanism developed.

For fear, however, that what has been presented may be looked upon as enthusiasm over a finished product of maximum effectiveness, let me say that like Mr. Cooke, I consider the questionnaire and evaluation sheet as used, *as only a beginning*. I say this fully appreciating the worth and value of this first real attempt on the part of engineers to give American industry a means for assaying waste, as to both cause and responsibility.

While wonderful progress has been made in the field of industrial or management engineering, the fact remains that due to a lack of proper terminology, an absence of definite units of measurement, and a lack of a uniform means for examination and evaluation, it has been necessary too many times to fall back on generalizations, opinions based on experience or reputation, indefinite conclusions and approximations. If progress to date is not all it should be, the lack can be charged to the failure to examine properly and evaluate definitely.

For this reason, it is my conviction that a much more rapid and efficient development of the art of management will begin from the moment a perfected mechanism for analysis and diagnosis is placed in the hands of our engineers. Especially is this so when it is considered that what was designed in so short a time, for rapid-fire use, was for *assay* purposes, and not for making *surveys*.

What has been done, however, will serve as an excellent foundation, and as an indication of future possibilities let me outline the following:

1. Additional studies will indicate other phases of industrial activities wherein wastes can occur, which should be included in the questionnaire.
2. More thought can be given to a better placement of questions under the proper cause of waste.
3. There can be a better arrangement of key questions, and subordinate questions under each cause, that the presentation may be more logical.
4. Greater care can be used in developing key questions, so that each may become a "leading" question in every sense of the word, and be so worded as to parallel the "hypothetical" question as used in legal procedure.
5. It would seem that there should be fewer key questions under *Organization* and *Utilization*, and more under *Technical*, perhaps ten under each, to facilitate an even pointing if desired. This would mean thirty key questions in all and would seem to be sufficient.
6. Conditions peculiar to a given industry can be met by dropping questions which do not apply, and add-

ing those which do apply, so long as the *class* of key questions, and not the key questions themselves, covers elements common to all industry.

7. The nature of questions can be further studied. You cannot ask a man if there are internal politics at work in his plant, and rely entirely on his answer, any more than the good wife can rely on the reply "hubby" gives her, when she asks if he is true to her. In other words, certain questions can be direct in character like—"When was the business incorporated?" Others must be indirect, as for instance—"Do workers have a voice in determining working hours and rules, to what extent, how and within what limits?" Others must be answered from impressions and further analysis, as "Are speeds and feeds up to best accepted practice?" There are also obvious questions and obscure questions. The question—"What idle time records are used?" is easily understood; while the question—"What type of mind (sales, financial, engineering or manufacturing) dominates the business?"—requires an explanation of what is meant by the four classes.

8. If no result is all waste, is an eighty per cent waste factor proper for a condition which can be characterized as "bad?"

9. Consideration should be given to the problem as to whether assignment of points according to causes should be left to judgment and impressions, or to a definite arrangement, as one-third to each, or fifty to *Utilization* and twenty-five each to *Organization* and *Technical Knowledge*, or some other basis.

10. Considerable thought should be given to the breakdown of points opposite each of the three causes, against management, labor and outside contacts. Should the points of possible waste vary within an industry, or should the variation be in the estimated waste factors? If the key questions represent major activities, or industrial factors and elements, cannot those under each cause be called 100 and a proper division made? For instance, let us consider that there are ten major elements in waste, each having ten points as follows:

Element	Management	Labor	Outside Contacts
1. Idle equipment and floor space.	10	..	..
2. Faulty workmanship and defective material	..	5	5
3. Low production per hour.....	5	5	..
4. Too much work in process and unbalanced inventories	10	..	..
5. Too frequent changes in jobs.	10	..	..
6. High labor turnover.....	5	5	..
7. Fatigue of workers.....	10	..	..
8. Untrained workers	5	5	..
9. Lack of standards.....	10	..	..
10. Periodic lack of orders.....	..	..	10
Total.....	65	20	15

If we had assigned points of possible waste against causes, as 40, 40 and 20, then we could multiply 65, 20 and 15 by 40, 40 and 20 and have:

Cause	Management	Labor	Outside Contacts	Total
Organization	26	8	6	40
Technical knowledge ...	26	8	6	40
Utilization	13	4	3	20
Totals.....	65	20	15	100

11. It would seem proper to retain the three divisions of cause and responsibility, although thought should be given to whether financing, or "capital" should be considered along with management, labor and outside contacts.

12. A way should be found whereby one industry can be compared with another. This could be brought about by attempting to reduce industrial activities to common elements, corresponding to the vertebrae in the human system.

13. Inasmuch as "best known practice" is considered standard, it is most important that the questions be most carefully developed so as to detect departure from standard in assaying the wastes, and to this end standard questionnaires according to industry might be well worth while.

14. Finally the matter of a "self-analysis" might well be considered. I am somewhat doubtful whether it can be done, for labor and management would be following best practice if they knew what it is and could introduce it. Any man, no matter who he is, who "doesn't know that he doesn't know," is bound to rate things higher than they should be rated, and this assay of waste in industry proved conclusively that on a "self analysis" basis entirely, waste and responsibility would have been evaluated at much less than the findings indicate. On the other hand, the task is not an impossible one, and if some of these avenues of further possibilities can be properly explored, the results might mean a plan of "self analysis" with corresponding evaluation which would be immensely valuable.

My presentation would not be complete without a few words regarding the application of the questionnaire and evaluation sheet to American industry. Concerns believe in having appraisals made, books audited, materials tested, mixtures analyzed, safety conditions inspected, equipment looked over periodically to anticipate wear and breakdowns, and operations subjected to more or less rigid process and final inspections. If these are important, how much more important is the matter of appraising, testing, analyzing and inspecting the management of an enterprise?

A banker recently said—"Yes, it is important to have a correct appraisal of your property, but how about your management? After all," he said, "it is your management, and not your plant and product that we are investing our depositors' money in, for without good management, these are in themselves not productive."

Up to this time investigations have not amounted to all that they should, because there has been no way of evaluating causes and responsibilities in definite figures. To say that the efficiency of something is "about" sixty per cent, while looking wise and mysterious after a hop-skip-and-jump through a plant, is guessing, and guessing is unscientific, and therefore has no place in an engineer's method of working.

To tell me that I am not looking well, when I never felt better, is going to make no impression on me at all, but a definite evaluation showing blood pressure 170, pulse 92 and temperature 101, is bound to force me to take medicine and perhaps go to bed, whether I like it or not.

The great American game, practiced considerably in industry, of "passing the buck," will cease when we can through some form of analysis and evaluation, localize causes of waste in a decided and definite way, and then place responsibility where it properly belongs. You will never kill off "it isn't so" and "I don't believe it," until some such plan is furnished.

For these reasons, an intelligent survey through a proper questionnaire and evaluation sheet should appeal to industrial managers, leaders of workers and financial executives. If it did nothing else, it would call attention to all of the essential elements of a business, many of which are so many times overlooked. Any intensive study of a business in a scientific way, as the basis for a mathematical appraisal, would turn up so many opportunities for improvement as to make such a survey most valuable and result producing.

My feeling is that now that the start has been made, the time will come when the "industrial audit" based on a perfected analysis and evaluation mechanism along the lines suggested, will be as much a part of our industrial activities as the "financial audit" is today.

In closing let me say that the Taylor Society is to be congratulated for taking the initiative in analyzing the questionnaire and evaluation sheet of the Committee on the Elimination of Waste in Industry, as the basis for further research and development. The work begun should go forward, because industry sadly needs a basis for more intelligent and comprehensive surveys, something it must have if we are ever going to convince

owners, bankers, executives and workers concerning the nature and extent of wastes and their part in the responsibility for wastes.

A joint committee is now at work on Management Terminology, another is just starting work on Standardizing Graphic Presentation. The Waste Report says—"The assays of waste show first, the need of definite and quantitative industrial information on a multitude of points." Is not this the time to begin a joint society work, on perfecting the mechanism of analysis and evaluation which was given to the industrial world by the Waste Committee? Could not it be a work which would go down in the annals of American Engineering, as comparable to Mr. Taylor's "Art of Cutting Metals," by taking the "bunk," the mystery and the false doctrines and practices out of that most recent of developments—industrial management?

DISCUSSION

BOYD FISHER:¹ If eighteen of the leading management engineers were to summarize their conclusions about waste in industry as they had observed it throughout their own experience, they could probably give a pretty accurate estimate of what that waste amounts to. Percentages are misleading, and usually not in point; but if they cared to say just what per cent of possible production were wasted, they might even be correct on that figure. Certainly none would care to dispute the weight of their combined authority. And, as for what portion of the waste is due to management and what portion to labor, one might reasonably assert that management engineers are in position to know.

The eighteen engineers for whom Mr. Knoeppel speaks are of highest standing. *No other eighteen* could be assembled whom we should consider better qualified to report on waste in industry. The mere fact of their working together on a joint enterprise and agreeing on a single report is unparalleled. Had they made their report on the basis of their own authority it would be listened to with respect, because they would have seemed to speak out of their years of experience.

Instead, they chose to report out of their several weeks of research. They ask the public to accept their report, not as a *statement of their opinions*—which would have been valuable—but as a *scientifically determined body of fact*, which it is not. The time was

¹ Lockwood, Green & Company, Boston.

too short and the sample too small to permit of a real test of industry, if a disinterested, objective investigation were to be the basis of report. Their personal authority cannot make up any portion of the deficiency in method of execution, because if we appeal to mathematics, we have to let the mathematics supply their own prestige.

And unfortunately, while claiming mathematical demonstration—even to the point of percentage figures—our engineers have substituted the results of subjective logic. Mr. Knoepfel has spread before us a set of questions which were used to test waste in industry. Not one of them is in itself a measure of actual output against a known standard of possible output. Neither a standard nor an actual figure is referred to. The questions relate to methods of management, which are presumed, in the minds of the investigators, to yield certain results. If a given plant followed approved methods it was assumed to be efficient. If not, it was presumed to be wasteful in whatever degree it suited the examiner to set down.

I doubt if we can accept this as scientific. A necessary basis of fact, a necessary step of proof, seems to be lacking. And as for asking the general public to accept it, I am sure that it is too much to expect. Personally I hold to the point of view of the questions asked. But as yet they represent minority opinion, precisely because they are abreast of the times. Business in general does not habitually act upon the basis of these standards, and will not consent to have its results prejudiced by those in advance.

I accept the standards of management set up by the Committee on Elimination of Waste, and have confidence that industrial statistics, if properly ascertained, would justify their standards. But I believe that they have been too eager to accept as cold facts, what is only a restatement, in terms of figures, of their own opinions. If the public, upon closer study of the report, comes to this point of view of it, those who reject the Committee's standards will have a weapon of attack forced into their hands. They will be able to offer the refutation of the Committee's claims as justification of their own conservative position.

The Committee set out to investigate waste. The method of inquiry, however, gives one the impression that they aimed rather to find support for certain doctrines of management. They may not really have so confused their aims, but I fear that they did run into the danger of causing a reaction against modern methods of management.

H. S. PERSON:¹ Mr. Fisher went to the heart of the problem when he expressed the opinion that the methods of the Committee's investigation were not scientific. He had in mind, I imagine, the methods of objective science—of the chemical, physics or engineering laboratory. I am sure the Committee would agree with him. To have employed the methods of objective science would have required a careful recording of classified results of management in each plant as now managed; and then a reorganization and new management of each plant in accordance with methods of least waste, with a recording of comparable classified results of such management; and finally a comparison of the two records and the drawing of conclusions. Such a procedure would have been in the nature of the case impracticable—not only in six months, but in six or sixty years.

In fact, I cannot recall that the Committee anywhere claims that the method employed is strictly scientific. In the report itself we read (p. 118); "it is evident that a considerable element of judgment enters into our relative evaluations . . . until these judgments can be tested and rectified in the light of later experience, too much reliance should not be placed upon the absolute accuracy of the several evaluations. . . . We feel that the chief value of this field report evaluation sheet is to be found not in the results of this investigation, but in that it constitutes an important *beginning* out of which will be perfected a very powerful and very valuable instrument for investigation." And in Mr. Knoepfel's paper this evening the statement is clearly made that the study of the Committee is considered an assay, not a survey; and Mr. Knoepfel's explanation of method is a frank statement that the evaluation is an evaluation according to "ear-marks"—according to judgments.

I wonder, however, whether the Committee did not bring to bear upon the problem a method of investigation which utilized the methods of objective science indirectly; and whether such indirect utilization of a method which in the nature of the case could not be utilized directly, was not the great constructive achievement of the Committee in method of investigation.

The findings of the Committee represent the estimates and judgments of a group of assayers, which on its face appears to be the opposite of the scientific method; but those estimates and judgments were in accordance with standards of appraisal which had been derived

¹ Managing Director, Taylor Society, New York.

from years of experience, scientific investigation and experiment in management methods. The members of the Committee, in earlier experiences with details of management affecting waste, and to a large extent in accordance with methods of objective science, had established indices of management with respect to waste; and then in this particular assay went out into the plants investigated, looked at the indices and appraised the waste in accordance with what these indices indicated.

The method was essentially the same as that of the medical diagnostician. He examines a patient, observes certain facts which to him are indices, and then makes a diagnosis which is a matter of estimate and judgment. His method in *actual diagnosis* is not the method of objective science; but behind his indices of conditions, and giving them dependability, has been a vast amount of pure science.

Now I do not wish to suggest that behind the work of the engineers of this Committee there was any such foundation of science as is behind the work of the medical diagnostician; my point is simply that the methods are the same, and to the extent that management engineering has used the scientific method in establishing indices of good management or of least waste, the scientific method of investigation was utilized indirectly or ultimately in this investigation, even though the immediate method was that of estimate and judgment.

A hypothetical case might make my point clear. Imagine that there were great necessity of making quickly an assay of the productive resources of agriculture in this state—a war of some duration is imminent, let us say, and it is necessary to make available what is now the loss of waste in poor agricultural methods. There is no method of objective science which is directly applicable. The most scientific statistical method is not available, for there are not dependable statistical data. But it would be possible to appoint a board of experts—expert because familiar with the methods and results of scientific investigation in detail in the field of agriculture—consisting of farmers who utilize scientific methods, professors of agricultural colleges and experiment stations, and so on. This board could agree upon a code of indices—based upon both research and experience (trial)—which would enable them rapidly to rate each farm with respect to the ratio of what it now produces to what it could produce under the most scientific methods of farming, with surprising accuracy. I would rather have that

rating—and I understand Mr. Fisher to say he would—than the rating of any statistical study, because the methods of statistics, while scientifically refined, cannot find dependable data to work upon. The application of the method of evaluation by objective experiment would be utterly impossible.

You know that buyers of stock on the hoof are so expert in estimating the weight of animals by observing indices, that they can time after time estimate the weight of an animal to within a few pounds; timber cruisers become so expert that they can estimate with a small percentage of error the millions of feet in a tract of standing timber. That sort of estimating entered into the work of this Committee; but the tests agreed upon by the Committee had behind them also a large amount of purely scientific experiment in detail.

The signal achievement of Mr. Hoover was in the selection of a group of eighteen men who, better than any other group of eighteen men we can name, in using the method of judgment by observing indices, were able to establish indices which have behind them not only long experience but also development in detail to a large extent by the methods of objective science.

QUESTION FROM THE AUDIENCE: What interests me is not how to get the facts—that is comparatively easy—what I am particularly interested in is how those facts are to be used. Nothing succeeds quite so well as success; and as an illustration of what I mean I would like to ask, for instance, what weight was given to personality? I know one of the largest plants in the United States, usually considered one of the most efficient, with respect to which practically all of the questions under organization would be answered in the negative. I should like to ask, in a perfectly good-natured way, by what authority, any individual, no matter how broad his experience, cares to say that the fact one does not have functional organization, that one does not have individual job tickets—such things as that—should constitute a specific per cent of waste. What weight is given to the personality of the drive in the force of the manager which makes unnecessary some of those things which scientific managers like to think are necessary?

MR. PERSON: That is another searching question, comparable to Mr. Fisher's question about whether the methods of the Committee were scientific. There is no question about the importance—and the intangible quality, from the point of view of measurement—of personality. I should, however, answer the question

in this way:

With respect to the relation between personality and technical organization and methods, establishments may be classified broadly as follows; strong personality, combined with evidence of weak organization and methods, weak personality combined with evidence of weak organization and methods, weak personality combined with evidence of strong organization and methods, and strong personality combined with evidence of strong organization and methods. Now, although these combinations do not occur with equal frequency, in making a survey or assay of an industry, it may be assumed if the sample is sufficient, that personality cancels out and the evidence of good or weak organization and methods remains a fair index.

I have said that these combinations do not occur with equal frequency; weak personality combined with evidence of weak organization and methods and strong personality combined with evidence of strong organization and methods are likely to occur more frequently than the other two combinations; therefore, canceling out personality, considering the purpose of the investigation, is a conservative procedure.

It should be borne in mind that the assay of this Committee was *not an assay of individual business success or profits earned*—profits to the individual may occur simultaneously with waste of the materials of industry. It was *an assay of waste of materials, labor-energy, capital, and opportunity for production*. Technical organization and methods are a better index of such waste than personality, or individual business success or profits.

E. E. HUNT:¹ One of the things planned for in this report and reluctantly excluded was a series of evaluations of industrial plants made by their own managers and not by our outside investigators. And the reason that those were excluded was simply that we did not receive a sufficiently large number of them to give a representative view. We had hoped to have as many as thirty, and we thought it would be valuable to compare the evaluations made by insiders with the evaluations made by outsiders.

Those inside evaluations would have been the best possible answers to Mr. Fisher's question.

The managers of the plants in Worcester, Mass., who saw this questionnaire in March expressed admiration for it and anxiety to put it to use. It was

they and not we who suggested the inside evaluations.

Any criticism from the point of view of the management of plants which has arisen since the report was published I think we should have in writing, to compare with the view of the plant managers in Worcester; but especially we should have it to make use of in the future revision of this questionnaire, which would seem to me one of the important tasks still to be undertaken by the Committee on Elimination of Waste.

I disagree radically with Mr. Knoeppel's encomiums on our accomplishment. In the first place, the questionnaire and evaluation sheet are only a part of the Waste Report. It is a mistake to overemphasize their importance. They happen to be the topics for discussion this evening, but it will give a totally false impression if they are presented to your consideration as anything but a first step. This questionnaire and evaluation sheet have about as much relation to a scientific mechanism for evaluating an industry as the anthropoid ape has to man. They are the merest beginning, important because they are a beginning. I for one have no illusions about them, and what I had hoped for here tonight was a severe technical analysis of these devices from the point of view of their applicability to industry today and tomorrow. Development of this device, not praise of it, is what we need.

From my experience as a member of the Committee on Elimination of Waste in Industry and as secretary of the recent Conference on Unemployment, I am convinced that we are just beginning to recognize waste in industry. Before the Unemployment Conference met, American industry, American civilization, had showed itself so careless about this great problem that we lacked even a method for determining the number of unemployed. Experts of the Department of Labor, estimating the unemployed only in terms of separations from hypothetical payrolls, set the figure at about 5,500,000. Experts of the Unemployment Conference set it at about 3,500,000 and not more than 4,000,000. Both figures were necessarily guesses, and this ludicrous difference was the result.

But unemployment is not confined to separations from payrolls in times of cyclical or seasonal depressions. Absenteeism is unemployment. Part-time is unemployment. Breakdowns of machines, failures of planning and administration, as the Waste Report shows—these things account for much idleness of workers during working hours—what Morris L. Cooke has called "unemployment within employment." There

¹ Secretary Committee on Elimination of Waste; Secretary President's Conference on Unemployment; Washington, D. C.

was no measurement of these by the experts of the Conference, and not even a guess was possible here. Yet these things are waste. They ceaselessly conduct a war of attrition against production, which periodically results in those industrial and social defeats which we call "business depressions." Periodically we sign a Punic peace with them, and as soon as possible the war begins again.

As methods develop for measuring these elements we shall begin to get quantitative estimates of waste in industry. We shall begin to measure not simply the degree of conscious technique of management as in the questionnaire and evaluation sheet shown in the Waste Report, but the concrete results of that technique or the lack of it as shown in terms of its twin products—men and goods.

PHILIP J. REILLY:¹ May I ask the Committee; first, whether the guide questions in the questionnaire were weighted, for the significance of the questions as indices of efficiency in organization and methods of operation vary greatly; second, whether the investigators, when they received answers from executives of plants investigated, assumed the answers were correct or checked up the accuracy of answers by further investigation?

FOR THE COMMITTEE: The questions were weighted. The answers of executives were checked up by the field investigators. It should be understood that the so-called questionnaire was not what is usually understood by the term; it constituted really a set of guide questions for investigators; it was the duty of investigators to get the *facts* by questions put to executives, by observations and by examination of records.

THOMAS W. MITCHELL:² The process of assigning relative value to the fifty items in the Field Work Evaluation Sheet was a difficult one; difficult because no one had hitherto paid attention to the individual power of these items. Consequently there was a great dearth of data.

Several methods were followed. One was to take such measurements of waste as were available—waste of capacity through seasonal idleness, waste through doing unnecessary work, waste of capacity through use of inferior methods and the like—and trace them step by step through the chain of causation back to items stated on the evaluation sheet. In some cases, where there had been no percentage measurement, as in waste of capacity through letting operatives run out of work,

the judgments of several persons who had had close contact with such factory conditions were combined.

A second method was to write each item on a card and then arrange these cards in the order of the judged importance of the items. Where relative values could be assigned to two or more non-adjacent items, when so arranged, this gave a certain measure of control over the assignment of values to intermediate items.

At the beginning of this process each engineer acted independently in assigning values to these items. These independent valuations were then brought together, compared and the differences threshed out.

One point that should be borne in mind is that we were endeavoring to assess the waste-producing power of each of fifty separate defects in management and organization. One question that was asked in connection with each item was this: If this specific item of mechanism were entirely absent and all the other forty-nine were present as fully and perfectly as is possible with this one absent, how much smaller would the output be than if this item also were present? The answer was a percentage of waste assigned to the one item.

A second question was this: If a plant had the very minimum of all these items of mechanism and this specific item should be applied, how much would the output be increased? Thus, if with the minimum of the mechanism of scientific management, a personnel department were set up with a competent head, by how much would output be increased?

The final result of this whole process was a set of maximum waste percentages. The fact that the waste percentages aggregated 225 per cent caused us no concern for the reason that they are *not additive* but are *multiplicative* items. The product of their complementary efficiency percentages was .0926, which indicated that with the absence of all scientific and systematic management mechanism, a clothing plant would turn out approximately 9¼ per cent of what it is capable.

We then scaled these waste percentages down proportionately so that their sum would be 100 per cent. These results constitute the base valuations placed upon the several items in our Evaluation Sheets.

C. L. BARNUM:¹ An impression seems to exist that the Evaluation Sheet is rigidly dependent on either negative or positive answers to the key questions of the questionnaire. However, an examination of the questions will show that that is not the case.

¹ Retail Research Association, New York.

² Consulting Engineer, Philadelphia.

¹ Management Engineer; served with the Committee in preparation of the Evaluation Sheet and as field investigator.

The first four questions, K1, K2, K3 and K4 are worded to bring out the type, suitability and degree of co-ordination of the organization, with reference, however, to size of plant and the class or character of product.

An answer of "No" to K1, "Have you an organization chart or its equivalent?" does not mean that the co-ordination of the organization is necessarily "bad"; but the answer obtained will indicate its suitability with reference to type and whether it is conscious or unconscious.

A small store where the owner is salesman, book-keeper and purchasing agent has an excellent co-ordinated organization. The average printing plant is small, averaging ten or twelve employees. One would not expect an organization chart in a plant of this size. In a plant of 500 to 1,000 employees, however, some definite division of functions and responsibilities is necessary.

A. J. PORTENAR:¹ As some of you here know, I am again working at my trade as printer. I was for seven years in the Employment Bureau of the New York State Labor Department, doing what I hope was good work and very happy in doing it. The last session of the legislature ripped the Labor Department wide open and then sewed it up again; but when they were finished there were different people inside of it, all civil service laws to the contrary notwithstanding. Personally it is not a question of money; I am earning more as a printer than the state paid me. Yet such skulduggery with the civil service personnel is waste—and quite an important form of waste.

Mr. Cooke came to me this evening with a copy of that evaluation sheet and called my attention to the figures on it and asked me to criticize the percentages assigned to labor. I told him I had not the slightest intention of doing such a thing on a five-minute acquaintance with the figures. After listening to the addresses of the various speakers and the questions asked by those who asked them, I am convinced that my determination was sound.

I want to speak about a certain phase of this question of waste which was touched on here—barely touched on—and that was restriction of output. There are two kinds of restriction of output, as Mr. Walter Polakov pointed out in a very notable interview I once read, and one of them was that part for which employers are responsible, about which I

intend to say nothing at this time.

The other part is the waste attributed to workers by conscious and deliberate restriction of output. I firmly believe there is not nearly so much of this as workers are charged with, but without attempting to "evaluate" the quantity of it, I want to put before you something in regard to it.

Somebody hires a man to do some work and at the end of the week he is handed his wages. Impliedly or otherwise, his employer lets him understand that he is through with that process. He has done the work he was hired to do, he has been paid for doing it. It is a closed transaction, and he is like a factor cancelled out of an equation. He has nothing to do with that end of the equation where you write an equal sign and then some figures. Now, the ideal employee is that person who takes an interest in his employer's business as though it were his own; that is, the kind of employee every employer is looking for. Yet you take away from him before he starts—in fact he never had and you won't give him—that incentive which would make it so much of his business that with the employer he would be only too glad to enlarge the figures after the equal sign.

My belief is that when—not if, but when—you will give to the workers an actual, positive share in management; when men shall sit in a board of directors not representing a dollar of investment but representing the human beings working in that plant, and those men know what the company buys, what it sells, what it sells it for, who it sells it to, how it makes it, how everything is done and why everything is done, and they have a voice there in the making and the buying and the selling and everything else that goes on, and in the end they have a share in what follows the equal sign; then you will give that incentive to those people to put into that industry, that business, that work, a personal sense of responsibility and a personal knowledge that will make employees of the kind that every employer, as I said before, always wanted—employees who take the same interest in his business as they do in their own. The answer is—*make it their own*.

Just one word more. At present the employer and the employee are like oil and water in one container—they don't mix. The employer's business is his business and only his. The employer's business is to get all he can for his product, seeing it through all the way. The employee's business is to get all he can for his work; what happens after that is not permitted to be any concern of his. Those are not the same

¹ Recently with the Employment Bureau of the New York State Labor Department.